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AN EVALUATION OF THE CHARACTER AND GUIDANCE FUNCTIONS OF THE GENERAL SHOP IN THE JUNIOR HIGH SCHOOL

SUBMITTED BY

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INTRODUCTION

**

Character and Guidance are two studies that have been considerably discussed in the last few years. It is recognized that there is a pressing need for both. Many Guidance programs have been set up and have done a great deal for the community, and the student. On the whole, however, they have been primarily concerned with the guidance of the pupil in the proper choice of a life career. This is a necessary function of the school, especially since it has become more and more necessary for the school to do some of those things that formerly were done by the home.

Today the home and the parent rely on the school not only for education in adademic matters, but also for character development and for the education to meet the experiences of life. The old home of our fathers is gradually disintegrating, the steadying influence, moral environment, etc. , are on the wane. To offset this the Church, Clubs, the Law, and the School have instituted programs that are aimed at the teaching of ideals for training in character and right moral attitudes.

There have been weaknesses in some of these organizations as they have been in a segregated field, and too often the habit of honesty, cooperation, loyalty,

care, etc., have failed to carry over into life situations. Since the junior high school was formed primarily for the purpose of exploration and for the guidance of the youth of the seventh, eighth, and ninth grades, much study has been made in the field for a curriculum for this new plan. This new plan has been able very largely to do away with the aold stereotyped form of education, and widen the scope of education for the adolescent age. This is as it should be, for it is during this period of the child's life that he is most susceptable to all ideas, suggestions, etc. It is during this period that his habits of later life are being formed, habits that are either good or bad, habits that are enduring.

Character Education is greatly indebted to science, especially to sociology, physiology, and psychology. These have lifted it out of the realm of superstition and magic. This subject was often thought of as a by-product of religious experience or revelation. Granting the conclusion of a cause for every effect, it has been elevated to the treatment of causes rather than that of symptoms. It has given a scientific method of getting at the truth; a genius for careful analysis is necessary. Science has provided the tools and the technics for us in the study of character, and it has

destroyed the old distinction between the natural and the supernatural.

Since we now know more of the elements of character it is evident that we can guide the student in acquiring those traits that have been established as good character traits, and in trying to avoid learning those habits that are poor and undesirable. It is through the regular class room activities that these traits must be acquired. This is sometimes called the "indirect method" as opposed to that where a certain period is set aside for teaching character traits.

Hartshorne favors the apprenticeship method. which means that the inexperienced may learn the various skills of life by working "on the job" with individuals who know the most efficient methods of procedure, and thus can be demonstrators and guides. A near approach to this is in the arts classes of the school but these generally do not deal with life situations of the pupils. There has ~~been~~ recently come into the field of the industrial arts a plan called the general shop, or comprehensive shop. This is in line with the development in science departments in the junior high school where general and not specific science is taught. General mathematics is taught, not specific mathematics, and so through the curriculum. If this has been found educa-

tionally and psychologically sound, then the same principle can be applied to the arts work.

Here there is a near approach to creative education. The student is allowed to do those things in which he has an interest, limited only by the amount of skill that he has acquired. This then is the proper atmosphere in which to teach character, and the method of teaching is through sympathetic guidance. The shop teacher has one of the best opportunities to come in close contact with the boys, and through this close contact numerous chances are given to correct and to guide. These corrections, made properly, and in developing those traits of character that may have some carry-over into life. A boy that has once learned to do neat, careful work, to have respect for the right of others, to assume responsibility, to have a respect for law and rules, has acquired thabits that are conducive to developing a good citizen, the possibilities of carrying these same habits over into later life are far greater than if learned in an artificial situation.

To that end the writer has endeavored to show that the general shop is the best method of teaching the industrial, arts in the junior high school; that educationally, psychologically, and socially, it provides real opportunities for character guidance.

HISTORY OF THE GUIDANCE MOVEMENT

**

Guidance is probably as old as the history of man. It has during its existance gone under various names. But as we study it more and more we find that it appears again and again during the centuries. It is possible that early man at some time during his life had to act as a teacher; to guide his own family, and especially his sons; to select for them their vocation, limited as it was. There were even at this period men who showed talent for certain phases of their limited life, and the "old men" of the group decided that those who had certain abilities along that line were educated in that field.

As life became more and more complicated, the training of the youth became more and more the duty of the leaders of the group. When the family was enlarged into the tribe, and later, the tribe into the nation, there were those who had to fulfill their duty to the nation; some became the men of war, others the priest class, others the traders, and still others became the agriculturists. Each had his place in the society of which he was in integral part. The nobles and the wealthy enjoyed what little education there was. Most of the learning was, at periods, in the hands of the priest class, and it is to that group that we are indebted for

our insight into the educational methods of the past. These priests later became more and more the educational preceptors of the race as well as the moral leaders. They set the standards and it is due to them that we have advanced in civilization. Since their guidance was both educational and moral, today we might call their form of guidance both Vocational and Educational, as well as Character Guidance or Education. Soon after the fall of Rome education and learning died out and all learning was concentrated in the hands of the Church. It kept the torch burning and when the revival came it handed on the torch which had been kept alight.

During early Greek and Roman eras it became necessary for man to do business in a rapidly expanding world. This made a certain degree of education necessary, and to the priests went the business man for his clerks and scribes. From this demand there arose a group of men who were able to do the writing and necessary mathematical computations that were so needed for the business developments of the time. This became an occupation and the writers were kept busy doing all types of work for their neighbors.

About the year 1200 it became recognized by some outstanding thinkers that it was only meet and right that all should have an opportunity to gain the education of

the day. And so into man's life came the school as a fore-runner of our school today. It meet with poor reception, and was criticized severely by leaders. Nevertheless it grew and has with periodic lapses continued to grow until today we have as a result the Public School system. It is true that it varies greatly in different parts of the world. But everwhere it is recognized now that the youth of a nation must be educated. To that end we have spent larger and larger sums of money, until there are many that feel that the educative process has become unduly expensive; that for the amount of money spent we are not showing commensurate results. It is not my point to argue that matter in this paper.

It remained for that branch of education which we now call the school to recognize that it had a part in the education for life. All education before 1150 had been for the prime purpose of fitting the recipient for the priest-hood, or the professions. Then for the first time came some who realized that there were other things that needed preparation than the classical training that had been given.

The first educational thinker of importance to see and clearly state this new conception in terms of the school was Herbart. (1) Seeing the education purposes in far clearer perspective than those who had preceded him,

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(1) Cubberly, Ellwood P. The History of Education

he showed that education must have for its function the preparation of men to live in organized society, and that character and social morality rather than individual development, must in consequence be the larger aim. Froebel, possessed of something of the same insight, and seeing clearly the educational importance of activity and expression, had opened up for children a wealth of new contacts with the world about them in the new type of educational institution that he created. He did not complete the work that he had planned to carry out, but in the hands of the Swedes and Finns similar ideas were worked out in practical form and made part of the school work. Applying Froebel's idea to instruction in the old trades and industries, declining in importance in the face of the rise of the factory system, they evolved the manual training activities, and these have since been important tools for giving to the young some intelligent ideas as to industrial relationships and economic problems ofour complex modern life.

The methods and purposes of instruction in the older subjects have been revised; new studies, which would serve to interpret to the young the industrial and social revolutions of the nineteenth century, have been introduced; the expression subjects--domestic arts, music, drawing, clay modeling, color work, manual arts, nature

study, gardening--have given a new direction to school work, and the study of science and the vocations has attained a place of importance hitherto unknown. During the last half century the school has been transformed, in the principal world nations, from a disciplinary institution where drill in mastering the rudiments of knowledge was given, into an instrument of democracy calculated to train young people for living, for useful service in the office and shop and home, and to prepare them for intelligent participation in the increasingly complex social and political and industrial life of the modern world. This transformation of the school has not always been easy, but the vastly changed conditions ofm odern life have demanded such a transformation in all progressive nations.

Cubberly states in his History of Education (1) that in a certain sense, "all education is vocational, in that it aims to prepare for some vocation in life." In Greece and Rome education was vocational in that it prepared one for service as a citizen of the State. During the Middle Ages education was to prepare one for a vocation in the Church. Later the vocation of a scholar appeared, and still later that of a gentleman. In each case throughout there was the element of some guidance present.

Today we no longer use the term vocational guidance for education in the broader sense, but restrict its use to the specific training of individuals for some useful

(1) Ibid

employment. Training for the law, medicine, the ministry, teaching, engineering, scientific agriculture, nursing, and commerce are examples of vocational education in its higher phases.

The report of the American Commission on National Aid to Vocational Educational defines vocational education as follows:

> "that form of education whose controlling purpose is to give training of a secondary grade to persons over fourteen years of age, for increased efficiency in useful employment in the trades and industries, in agriculture, in commerce, and commercial pursuits, and in callings based upon a knowledge of home economics."

The occupations included under these are almost endless in number and variety.

Used in this sense vocational education is an application of technical knowledge worked out in the schools, for the ordinary vocations of a modern industrial world. As such it is the product of the Industrial Revolution and the breakdown of the age old system of apprenticeship training, and represents another of the important recent extensions of educational advantages to the masses of people who labor with hands to earn their daily bread.

Besides making education more representative by extending its advantages to those who work in the shop and the office and on the farm, vocational education tends to correct many of the evils of the modern industrial life.

It puts the worker in possession of a great body of modern scientific facts relating to his work which keeps him, for several years after he has become a wage earner and at a very impressionable age of his life, under the directing care of the school. It thus tends to counteract the specialization and routine of the shop, which wears out his body before nature has completed its development in form and power, which blunts the intelligence the school had tried to awaken, and which shrivels up his heart and imagination, and destroys his spirit of work.

In the United States but little attention was given to education the young people for the vocations of life until about 1905-1910, though modern factory manufacturing conditions had before this largely destroyed the old apprenticeship type of training. It was largely the conditions that were brought into being by the Industrial Revolution that started the idea of some educational information in formal way. Numerous attempts were made at various times by people interested in the matter. In 1881 a little book wholly devoted to the subject of choosing a vocation. It is a very curious volume, but full of the need for vocational guidance and information and the service that would be rendered. The author, Lysander S. Richards, attempted to coin the word "vocophy" for the

title. His point of view is shown in an extract from the preface:(1)

> "All we claim to perforn is to bring order out of chaos, and form or establish a system to enable a person to find the most fitting pursuit in which he can reap the greatest success that is possible for him individually to attain."

However, this book was only one of the fore-runners of the subject. It merely pointed out that there was a need for a vocational education program. Richards favors Phrenology, though he states that even that has its limitations. His plan was to have an expert adviser or proscriber in each city to whom persons could go for expert advice. He made little study of the occupation, and even in his study of the individual he tells chiefly what occupations to avoid rather than what to follow.

It is to Frank Parsons that we must give the credit for the coinage of the term Vocational Guidance. He used a thorough and painstaking study of the occupations involved. His method is somewhat like that used today in a certain class where occupational information is given. The occupation is thoroughly studied, its advantages, disadvantages, the type of person needed, his abilities, possible future, salary, etc. Further he wrote about his work. It is essential that for a study to progress one must write his findings, and thus enable others to take these findings and progress from that point. This Parsons

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Richards, Lysander S in Brewer, John M. The Vocational Guidance movement p. 24

did and so gave an opportunity for his followers to build on his work. His text on "Choosing an Occupation" will perhaps always have a place in any library of Vocational Guidance.

The Civic Service House, Boston in which he began his counselling was organized by Meyer Bloomfield in 1901. In 1903, Phillip Davis, the present director came as assistant. These forms of guidance advocated (by these men) still, however, dealt with the older groups and with those choosing an occupation. We have yet to find the type of guidance that is applicable to the junior high school student. That is in itself a somewhat different problem. Still the development was to come, as it was simply the outgrowth of the older persons' guidance that proved the point that much of this maladjustment might be avoided if the persons received their guidance and counselling while in the earlier grades of the school. Many of the older types of students have been greatly benefitted by the work done by the Civic Service House, by the Boston Vocational Bureau, by the Vocational Guidance Department of the Boston Public Schools and of other cities. These forms of guidance vary greatly and each claims that it meets the needs of the community with which it is connected. For the type that is used in schools, there have evolved various methods of checking

on the graduates of the school, both for their own benefit and for the knowledge gained that may be used and passed on to those yet in school. Records are kept of those graduates of the school for a period after their graduation and their entry into some field of fruitful endeavor. Information is gathered and kept on the occupations and industries of the community; this is disseminated to the student in the way that will prove ofmost value to him. Then there is the problem of the youth who is not to enter directly into some field of endeavor, but who is to attend some college for a period of time and then enter some employment. Again, there are those who plan to enter the professions, and all types together need guidance for the field that they are to enter; the requirements for the work, its opportunities, the possible amount of money that can be expected; for none will be of the frame of mind where

> "no one will work for money
> and no one will work for gain,
> but each for the joy of the working--",

so we must teach them the salary limitations of the occupations, and the amount that each can possible receive. Information concerning the various colleges must be secured; the type of education that is necessary for entrance to that college, the extent of preparation that is essential for such professions as law and medicine. All

these items are integral parts of the guidance course.

There are various methods of giving this information to the students. One method is through personal counselling. This means an organization, however, where each student may come for a personal interview with the counselor. This plan is expensive and can not be adapted to some cities where there is no money other than that for teachers, and not too much of that. Some school systems have the method of having as an integral part of the curriculum a course called by various names. Vocational Guidance, Occupational Information, Business Employments, Vocational Civics, are some of the terms used. The course treats of the various occupations of the community and those positions into which the student may go. It is a two-fold course. There are many who will leave at the completion of the junior high school course, and there are those who will go on. For the latter the course is of primary importance. It gives them the occupational information, sure enough, but it goes a step beyond and gives the educational requirements for that and other similar positions. These educational requirements are discussed thoroughtly, and the courses for the ninth, tenth, eleventh, and twelvth grades are spoken of, so that when the student has finished the course, if he or she has an idea of the line of work in which he is par-

ticularly interested, then the matter of choosing the proper course for succeeding years is a matter of completing his own education for the job that he wishes. The information as given may run all the way from the professions through the forms of skilled labor, and unskilled labor for the boys, and the same form is used more or less for the girls. The groups are taught separately so that there is no lack of interest. These courses may be spread out over the seventh and eighth grades and very little is done in the ninth grade. It is here that possibly some form of individual counselling might be done to very good advantage. It is true too often that here a student may change his mind or force of circumstance may change if for him. The prime purpose of the junior high school is that of exploration. We may have courses and we may study occupations, and we may teach all we wish of trades in the abstract, but there are still many who do not get the knowledge until they meet if first hand and have had some experience with it. The method of tryout courses is used a great many junior high schools. This form, however, is due to the fact that the junior high school in many cities has been modelled upon the senior high school, and so we have had thrust on us not a new school, with new ideas, but a new building and a new grouping, with all

the old features attacted. Our shops have been copies of the senior high school shops and rather than being exploratory shops, have been made specialized shops. It is natural that all teachers wish to have those students whom they teach show that they do know how to do the things that they have been taught, and to do a fairly good job. Hence the specialization. Koos and Kefauver in a study of forty six junior high schools report that a number of the courses such as woodwork, cooking and sewing, are probably more nearly specialized than exploratory. The exploratory program has been closely associated with the practical arts and all courses in this large field are considered by some to be exploratory. It is in this field that most has been done to provide a variety of exploratory experience.

This is not always true, but it is true in a sufficient number of cases to warrant the generalization that it is a value and has justified its existance in the educational program, and has been of value to a large number of individuals. Koos and Kefauver report the result of the percentage of forty-six high schools with different courses that are reported to be exploratory. Woodworking may be seen to dominate in grades Vll and Vlll.(1)

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(1) Koos and Kefauver, Guidance in Secondary Schools. P.

Courses	Grade VII	Grade VIII	GradeLX	One or more grades
Woodwork	63.0	67.4	58.7	80.4
Machine shop	13.0	19.6	17.4	21.7
Seet metal	23.9	26.1	17.4	39.1
Automobile mech.	3.0	13.0	15.2	21.7
Mechanical Drw.	45.7	52.2	50.0	71.7
Electricity	32.6	32.6	26.1	54.3
Printing	19.6	21.7	13.0	28.3
Typing	----	23.9	17.4	28.3
Shorthand	----	2.2	6.5	6.5
Bookkeeping	----	4.3	23.9	23.9
Elem. Business	2.2	17.4	15.2	30.4
Cooking	56.5	56.3	37.0	67.4
Sewing	60.9	52.2	41.3	65.2
Agriculture	4.3	4.3	6.5	10.9
Music	52.2	50.0	45.7	52.2
Freehand Drw.	47.8	43.5	39.1	47.8
General shop	32.6	21.7	17.4	36.9

This is a carry-over from the manual training frequently given in the later years of the elementary and in the high school. General shop with its different type of activities occurs most often in the seventh grade. Other works that may appear in the general shop program as Mechanical Drawing, Machine Shop, Sheet Metal, Automobile Mechanics, Electricity, and Printing. are less frequent.

Guidance as now practiced in the schools of this country varies greatly. It is bound up with vocational education and allied forms of education and the alliance is so close that we do not think of it as guidance but as one of the subjects of the school curriculum. Indeed there are

many who are engaged in that field of education who do not feel that they are counsellors or guidance directors, but are rather teachers of vocational civics. It fails, however, to function as it should. That is true of the shop courses that were to have the prime purpose of exploration and have guidance functions. These have for the most part degenerated into shop courses in which the student is graded in very much the same manner as his other work, and in which a certain mark must be gained in order to be promoted. Too often the functions of the junior high school have been lost sight of. The schools have taken on too many functions of the senior high school and have endeavord to make them over to fit the other school, and the result has been that the benefit that was to have been derived from the inauguration of the new system has been lost. All that remains is a fine group of buildings, to which we have assigned the seventh, eighth, and ninth grades. We have also copied our program of studies from that of the senior high school and continued as blithly as though we had never had such a thing to bother with as junior high school.

There have been numerous reasons for the establishment of the junior high school. Briggs in his book "The Junior High School" states that there are thirty-five. (1) Among those as set forth by the North Central Association

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(1) Briggs, T. H. The Junior High School, in Johnson F. W. Administration and Supervision of the High School.

of Colleges and Secondary Schools are:

1. To continue through its instructional program the aims of public education in a democracy.

2. To reduce to the minimum the elimination of pupils by offering types of work best suited to their interest, needs, and capacities.

3. To give the pupil an opportunity under systematic educational guidance to discover his dominant interest, capacities, and limitations with reference to his future vocational activities or the continuance of his education in higher schools.

4. To economize time through such organization and administration of subjects and courses both for those who will continue their education in higher schools and for those who will enter immediately into lifes activities.

From a survey of the voluminous literature on the junior high school, Briggs' summarizes the claims which have been made for the junior high school form of organization as follows: (1)

1. That it will bring about certain administrative advantages such as (1) Classes of approximately normal size: (2) a larger use of the school plant; (3) a more efficient use of the time of the special teachers and supervisors: (4) the offering of differentiated curricula; (5) departmental teaching; (6) promotion by subject.

2. That it will make easier the desired reforms in curricula, courses of study, and extra class room activities.

3. That it will find or develop better class-room teachers.

4. That it will provide better for the varying needs of pupils due to individual differences.

5. That it will retain pupils longer in school, facilitate their transition to higher schools, save time for them, and result in a more effective training in character.

Leonard V. Koos has prepared a table of analysis of

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(1) Ibid

values from the articles of forty writers who are authorities. They have been arranged so as to give a comparison between the cardinal principles of education and the peculiar functions of the junior high school. Although the statements are couched in general terms, and there is a certain amount of overlapping, they may be used to advantages.(1)

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(1) Adapted from Koos, L. V., Analysis of the General Literature of Extra Curricular Activities". Twenty fifth Yearbook, Nation Society for the study of education. Part 11 p. 11, 1926

Values relating to	Frequency of mention in the forty writings
1 Seven Cardinal Objectives of Secondary Education.	
1. Training in civic social and moral relationships.	37
2. Socialization.	23
3. Training for leadership.	22
4. Training for social cooperation	19
5. Actual experience in group life.	17
6. Training for citizenship in a democracy.	16
7. Training for recreational and aesthetic participation.	15
8. Training for ethical living.	11
9. Health.	10
10. Relation of school to the community.	7
11. Intellectual development.	7
12. Training in business methods.	4
13. Vocational training.	4
14. Training for worthy home membership.	4
15. Training in parliamentary usage.	3
16. Worth while friendships.	3
17. Training in fundamental processes.	3
11 Peculiar Functions of the Junior High School.	
18. Recognition of adolescent nature.	24
19. Improved discipline and school spirit.	21
20. Recognition of pupil interests and ambitions.	12
21. Improved scholarship.	8
22. Constructive influence on instruction.	6
23. Exploration of interests and abilities.	5
24. Discharge of superabundant energies of pupils.	4
25. Retention of pupils in school.	4

PRESENT METHODS OF SHOP INSTRUCTION IN THE JUNIOR HIGH SCHOOL.

PRINTING.

**

The most common type of shop that is now used both in the junior high and senior high school is the so-called specialized shop. By that we mean that the instruction given is not allied to any other shop in the school. All the componant parts of the shop are housed in one room under the direction of the teacher of the specific trade, and the information that is taught there concerns that particular trade only.

The various branches that go to comprise that trade and its allied trades are taught. By this is not meant that if the trade is, for example, printing, that all the allied trades are taught too, but that the student is made aware of, and some information is given concerning these too. When the field of trade teaching was opened in the schools, it was necessary to do one of two things; either have the teacher of the school secure the information necessary to instruct in the trade or to secure some one who knew the trade and make a teacher of him. The latter method was the one most commonly used, and in a great many communities is still the most usual course.

Today, however, there are schools and colleges that

have as one of their prime objectives the education of men and women who can teach the occupations and trades in the schools, and who are also trained in the field of education. It is a foregone conclusion that eventually the school shops will be staffed by men who are first of all educators, and secondly trade teachers. Then their work will, let us hope, be more of a guidance factor than is the present method of instruction.

It is a truth that is undeniable that as we go on in our civilization we will need more and more printed matter. The printers say there is a need for good men in their trade at all times, and the time to start pupils on this path is while they are young. The work has grown more and more complex and today the printers trade includes several other allied trades.

When Franklin learned to be a printer he stood before a case in which the type was kept in a series of small compartments, or boxes. The young printer had to learn this case thoroughly, so that with his copy before him his hand could go quickly and accurately to the compartments containing the proper letters. In many offices today the use of the case is still maintained. Much of the typesetting, however, is now done by the linotype and monotype machines. They are not used in the schools as they are expensive, and beyond the scope of the public schools.

Associated with printing are lines that are closely allied. In many shops it is essential that the printer know about these other trades and in some cases to have an experienced working knowledge of them. Among these are the proof-reader, the electro-typer, the engraver, and the pressman. Ruling, binding, and embossing is found in most printing plants of any size, but the work is done by specialists and very often by machines.

One of the advantages of the printer's trade is the steady employment, possibly no other tradesman being more regularly employed than the printer. Again his work may keep him in touch with new ideas, which may prove of particular value to him. As a rule the printer's activities include sufficient variety to prevent any monotony in the day's work. Disadvantages are found in the possibility of lead poisoning, the bad ventilation in which job-work and electro-typing are done, and the night work required by the daily newspaper.

A good common school education is necessary, but if one has the good fortune to have had the advantage of a high school education he will find the additional education of advantage to him. Correct spelling, proper punctuation, and a knowledge of grammar are especially important.

A brief analysis of various phases of the trade will

be of value in judging the specialized shop. The Typeseter I have already discussed sufficiently, and the allied job of proofreader needs little explanation. After the type is set up, a "proof" or preliminary impression, is struck off, and is taken by the proofreader and compared in spelling, punctuation, and paragraphing with the original manuscript. This purely mechanical work does not exhaust the functions of the proofreader in large publishing houses, where the work includes minor editorial features as well. Besides technical training the proofreader needs a good general education and an accurate knowledge of the English language.

When a great many copies of a circular are to be made, or a book set up which may run through several editions, "plates" are made, and the impressions are printed from these instead of from type. This is the electrotyper's job. These plates are of hard metal, and the making of them requires several distinct processes. The workman is called an electro-typer, and usually is employed by a book-publishing house, a big newspaper plant, or a concern engaged exclusively in electrotyping for publishing firms. The wages are rather better than for typesetting, but positions are by no means so numerous.

Pictures in book as well as in magazines and newspapers have been made by the half-tone process. The work

requires highly skilled persons, and is usually done by concerns making this their exclusive business. The demand for engravers is large, but at present there are few schools of instruction, and for most boys the only way, open is through apprenticeship.

PRINTING SHOP (1)

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The primary purpose of a printing course in the junior high school is printing-trade exploration and language study. An effective course in this direction presupposes the use of modern machinery and standard materials, tools, and accessories in common use in the practive of the trade. For those students who elect printing, hand composition, command of English, simple job work, and platen-press feeding should be emphasized. The success of printing depends upon a thorough and systematic directing of the student's development. (1)

A few objectives that are worked for are:

1. To provide experiences which will show the practical application and value of academic subjects, especially language.
2. To develop a pride in personal achievements.
3. To cultivate an appreciation of the value of cooperation and service.
4. To develop an appreciation of good printing.
5. To help in forming habits of accuracy, thoroughness, neatness, industry, and correct use of language in speech and printed form.

Instruction sheets are used throughout the course in printing, because practically all content material and

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(1) Summary of printing courses offered in a number of Junior High Schools investigated by the writer.

operations in the junior high school grades can best be taught this way.

Shop talks are given at first, but these are short and are for the purpose of explaining the technique of type-setting, the use of language as a tool, the size of spacing material, the point system, etc. These talks aim to cover only one point at a time. The shop talk is followed by some job, or exercise, that demonstrates the matter covered in the talk. As the class advances the material becomes more technical such as the page makeup, form layout, margins, etc.

The whole course is exploratory, but its aim is to show the boys the benefits of the printer's trade, and to guide those interested into that field. There is very little if any association with other shop work of the junior high school.

ELECTRICITY

**

Today with electric lights in practically all modern dwellings and with electric power in many blocks and factories, there is a great demand for well trained electricians. There are many kinds of electrical workers, each practically a specialist, but I shall treat only one; that allied to the building trades; the one who wires our homes and buildings and installs the lights, and, if desired, electric motors and heating equipment.

The prospective electrician requires a thorough technical training, as well as much practical experience gained under skilled instructors in wiring, and installing bells, annunciators, arc and incandescent lights, motors, etc., before he can start as an independent journeyman.

The prospective electrician should have a mechanical bent, should be interested in study, and have an absorbing interest in electrical devices of all kinds. He should specialize in mathematics, mechanical and electricity.

This is all beyond the scope of the junior high school, so the writer believes that here is one of the strong arguments for the specialized shop partially refuted. It can only hope to give a smattering of this knowledge.

About the most that we can hope to teach the student in the school is the barest fundamentals of the trade. These are taught as steps leading to the greater knowledge of the subject. The technical side of the material is too vast and complicated for the average student with his limited background to grasp. This is true of all the specialized trades that are taught in the school. An experienced electrical contractor stated that he would rather have a boy come to him to learn the trade with no experience in electricity, and he would teach him the way it should be done. The same story was told by a Sheet Metal contractor, who stated in a conversation that he had employed so-and-so as a journeyman for a time, and had to let him go and that now he is teaching boys how to become sheet metal mechanics in a school where that is one of the trades taught. He believes that a boy is more valuable to him if he knows absolutely nothing of the mechanics of the job, and learns them while working on them. There is so much to unlearn in the field of practical mechanics that the boy comes confused and the learning process is longer, and costlier.

Give me a boy who is intelligent, who can draw, and read a mechanical drawing, who is able to figure correctly, and who can do as he is told on a job and apply his own intelligence to meet an emergency, and I will hire

every time rather than the one who has learned it all in school.

ELECTRICITY SHOP (1)

**

The objectives as set forth in the present specialized shop are : to teach simple and fundamental laws pertaining to magnetism and electricity; to teach the simple laws pertaining to current flow, resistance, and pressure; to provide opportunities for handling low voltage currents; to provide pooportunities of an exploratory nature which will allow for a better counselling and guidance progran; to co-ordinate the home and school by a mutual exhange of problems; to provide a training which will enable intelligent and safe operation of electrical home appliances; and to provide instruction in reading and writing the electrical language of industry.

The instruction is a bit different, in that electricity can not be seen, and so the talks should not be too theoretical. The opportunity to observe as well as perform experiments within the bounds of the boy's ability should be given. The shop should contain many simple pieces of electrical apparatus for the purpose of showing the performances of electricity and magnetism.

The shop work should be supplemented with magazine reading, job sheets, and information sheets. A Shop library increases the value of the course. Demonstrations

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(1) Summary of programs as taught in Junior High Schools as investigated by writer.

should be dynamic in order to emphasize the important parts of the work.

The facts that are derived are those that will give the student the ability; to do simple repair work on electrical devices found in the home; to make series and parallel connections; to join and solder electrical splices; to splice, solder, and recover heater cords; to connect switches, terminals, clips, screws, and battery connections to conductor wires; to write with a fair degree of skill the industrial electrical language; to interpret the written electric language; to insulate and wind simple coils for use in elementary electrical problems: and to erect wiring problems, such as bell circuits, low voltage lamp circuits, etc.

The tests used are of the objective type and such others as the instructor may devise to fit the instruction that he is giving.

(1) SHEETMETAL

**

Sheet metal work is becoming more and more common, now that we have garages, homes, ventilation systems, and a thousand other things made of galvanized iron. The man who folds these into the required shapes for placing in our homes needs a certain amount of technical knowledge. How much of this can be given in a junior high school sheet metal shop is problematical. It certainly can not proceed for beyond the "gadget" stage, dustpans, inkwell fillers, pails, lanterns, and small articles mainly of the tinsmith type. The amount of skill acquired in the handling of the various machines of the commercial ship is small and could be learned in a short time in the trade.

The machines are not as costly as one might expect from a glance at the size of them, but the floor space that is needed to house one of the specialized shops of this type is far in excess of that which could be utilized more effeciently for a unit shop in the general shop plan.

Plumbing as taught in the schools today is merely the beginning of the trade and the amount of knowledge that is gained has to be largely relearned once the boy enters the employ of the master plumber. He perhaps

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(1) Summary of Sheet-metal courses taught in Junior High Schools as investigated by writer.

learns how to use taps and dies, and how to wipe a joint fairly well, but the actual preparation for a good job is practically negligible.

SHEEP-METAL SHOP(1)

**

The objectives of the sheet metal shop are; to develop and fix an understanding of the methods employed in shaping products from sheet metals: to give an appreciation of sheet metal as used in everyday life and industry: to teach how to recognize sheet metals from the standpoint of kind, gauge, material, and protective coatings: to stimulate an interest in constructing at home, sheet metal projects which require operations that have been learned at school: to develop from other sheet metal articles, something else of material value; to give the pupil an insight into the possibilities of sheet metal trades as a vocation, and to aid him in finding himself.

The instruction generally follows that of the other shop methods; namely, that of classroom instruction by a demonstration of the operations; then the doing of that and other operations by the students under supervision and correction by the instructor: and the making of set projects that are included in the course of study which involve the skills that are set forth to be learned in the course.

The knowledge acquired from this shop should be the ability:

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(1) Summary of Sheet-metal Courses as taught in Junior High School as investigated by writer.

1. To cut accurately the various sheet metal layouts.
2. To join pieces and ends as one, by solder, seaming, riviting, and sweating.
3. To lay out simple patterns.
4. To use the simple machines of simple operations.
5. To form simple shapes in sheet metals.
6. To record neatly and accurately results of sheet metal procedure.
7. To properly tin and handle the soldering copper.

The traits and habits that are to be developed are: Systematic procedure, initiative, industry, courtesy, altruism, accuracy to a fair degree, neatness, and perseverance.

The tests are objective in nature: true-false tests, multiple choice, matching, completion, etc., oral testing in class and laboratory periods, and the working out of problems that are applicable to the metal trades.

AUTO MECHANICS[1]

**

The objectives of the specialized shop in Auto Mechanics, ninth grade, are primarily; to develop an fix an understanding of the simple laws of automobile operation; to give experience by actual contacts with the various important units of the car: to be able to recognize the need of repair and make necessary minor adjustments; to stimulate an interest in performing at home some of the automotive problems carried on at school: to develop and gain a knowledge of road courtesy, traffic regulation and law: to give a pupil an insight into the magnitude of the automotive industries and its relationship to other industries with the knowledge of the importance the automobile and its industries play in every day life: and to permit an insight into the possibilities of the various automotive fields as vocations.

The instruction is given by means of wall charts, demonstrations as in a laboratory course, shopwork carried on under supervision after instruction has been supplemented with information and job sheets, assignments of outside readings and reports to the class. The time allotment should be about three hours per week for a period of ten weeks or more. The information to be gained is very nearly similar to the objectives of the course, with

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[1] Summary of Mechanics Courses taught in Junior High School as investigated by the writer.

the addition of some other allied features pertaining to the dangers that are tobbe met.

The skills that are to be derived are; the making emergency repairs: replacement and inflation of tires; the packing of a leaky water pump; cleaning of spark plugs and setting the gap; grinding of valves and cleaning out of carbon: replacing a leaky hose; replacemtn of gaskets; the repair of a leaky fuel line; cleaning of a clogged fuel line: the tightening of loose connections and bolts: addition of water to the battery; painting the top; removal of dents from fenders; proper greasing and oiling the chassis; the repair of tire chains; the renewal of an oil filter cartridge, etc.

The specialized shop aims at the dev elopment of certain traits and habits, which if developed would be fine, but their development is dubious. These are:

1. The ability to think carefully.
2. To be prompt and punctual.
3. To clean up after each job.
4. To protect upholstered surfaces from grease, etc.
5. To develop perseverance.
6. To develop orderliness.
7. To gain accuracy.

The testing as carried on in the newer shops is of the objective type; the oral questioning in class and laboratory demonstration, aptitude tests, and the working out of problems in laboratory.

The equipment is the same as that of the general shop which is listed elsewhere.

MANUAL TRAINING(1)

**

The present method of manual training used in the industrial arts work is perhaps too common. to dwell on at any great lenght. It is the oldest of the shop classes in the public school, and so has developed perhaps better than have the others. The acquisition of certain skills is the keynote of the course; the ability to square a bit of wood; to plane and smooth this to exact dimensions: to combine these operations with others in the manufacture of projects: to recognize the part that woodcraft plays in the other industries. These are some of the opportunities and fields open to the worker in woods.

The methods of instruction are similar to those of the other shops: demonstrations in the use and purpose of the tools: then the use of these operations by the students with the supervision of the instructor. The making of certain projects that are contained in the course of study as a means of developing and combining the skills learned in classes is a necessary method for instruction procedure.

The cognizance of the types of wood are taught and the general value of each with the forms of grain and fibre. The finishing of different woods, the processes involved in sandpapering and painting or varnishing or shel-

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(1) Summary of Junior High School as investigated by writer.

lacking of finished surfaces are necessary acquirements in this shop.

MECHANICAL DRAWING (1)

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Mechanical Drawing is the subject that has more relation to the other shop material than possible any other subject. Its use in woodworking, machine shop, automotive shop, electrical shop, sheet metal shop, and such other industrial arts work as given in the junior high school is almost limitless. One of the objectives stated in most of the other shop courses is that of being able to read a drawing and interpret its use. This is the function of drawing.

The ability to draw neatly, accurately and to scale such objects, material, or problems as are given in the course, knowledge of types of lettering, signs used in drawing, keys, etc., the ability to enlarge or reduce to a certain scale; all these are essential of this study.

Teaching devices follow very closely those of the regular class-room procedure; namely, the demonstrations of plates or charts, the copying of these with particular attention to neatness and accuracy. Tests are very largely of the objective type; true-false, multiple choice, matching, and completion, and oral questioning during class periods of instruction on such material as the instructor wishes emphasized.

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(1) Summary of courses by writer.

THE SHORTCOMINGS OF THE PRESENT SYSTEM

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Naturally there are very few of the present shop teachers who can be convinced that the General Shop is better, more efficient, fulfills the function of exploration, serves the community better, meets the needs of the individual, than the shop as it is at present constituted. It is probably true that there are communities where there is room for debate over the value of the Unit Shop versus the General Shop. In a community where there are manufacturing interests to serve, and where the school serves as a feeder for those interest, possibly the Unit Shops are of more value. If that is true then we can raise the question, "Is it the duty of the school to prepare students for the various occupations and trades?" If that is the function of our school system then we had better reorganize the entire educational structure. As education, it is strictly vocational and takes the position of a trade school in the community. If there is no trade school in this community and the above are the objectives of the schools serving this city or town, then our schools, rather then being strictly educational are trade and vocational schools.

If we are to provide these vocational opportunities for the male youth of the school population then we should

in all fairness do the same for the girls. We must make a census of the occupations available for women and do our best to so educate the girls that when they leave school they will be fitted to take their place alongside their brothers in the life of the community. It will be a difficult task to decide what trades and occupations are to be taught in this system, but if doing so meets the need of the community, the school must recognize and serve this need.

But then possibly all the students are not to enter industry right away, but will go on into High School and from there enter the industrial world. There is the possibility that even in such a community some will have plans for college and the university, and even advanced training for the professions. What are we going to do for them? Are we going to neglect the few for the majority? We are to a certain extent doing that very thing now only in the reverse. Surely there is a balance somewhere. A common meeting ground where all can get together and move toward their own separate goals with a united front is now our problem.

Today we take the boy in the Junior High School and give him several choices. He is told that he is to choose a course that will lead him through high school and on into college and the professionals schools. Or he is told

that he may select a course that is semi-vocational in its training; that of training for business, the commercial schools and the offices, clerical work, book-keeping, stenography, filing clerks, and routine jobs. Or he is told, usually in a rather blunt fashion, that it would be advisable for him to choose the Mechanics Arts Course, as he has shown an inability to do work of a sufficiently high grade to warrant his attempting a college and even a commercial course in the junior high school and the high school. The pupil therefore, is steered into that course which he does not wish , and he knows stills less where he is heading. Assuming that he has taken any one of these courses he finds that in the first year of junior high school he has the same work that the other students have; that apparently there is no difference. His grades may not be as good as theirs, but that may or may not worry him. Thus he goes on through the seventh grade and then he is asked to select his courses over again. This time he must secure his parents approval, and they knowing less than he, follow his choice and give their consent to the curriculum that he selects. A few of those parents more wary and more interested than the others may call at the school and confer with the teacher or principal and learn more of what these choices of course mean for his child. He learns that if the child

selects an arts curriculum he is barred from college unless he at a later period makes up those courses that the college require for entrance. He learns also that the arts curriculum is primarily for those who do not intend to attend schools of higher learning, but who plan to go into the trades or factories as means of livelihood. Furthermore, if his child selects a college or commercial curriculum he will take manual training in the eighth grade and none in the ninth grade. In the arts course, in some schools the child has to take in rotation the various courses that the school offers. These may vary depending on the size of the school and the community in which it is located. Usually they are manual training, electrical shop, printing, plumbing, sheet metal, and often automobile work. The common practice is that of placement by selection, but then we have the boy who selects because his pal is also selecting that particular shop. When there are too many boys to place them all in any one shop on the basis of their own first choice, then the second and third and fourth choice is given. They then remain in these shops for a varying period. In some schools this period runs any where from nine weeks to eighteen or twenty. They rotate through these shops and at the end of their ninth year are to make a choice of that field in which they will major for

their high school or tenth, eleventh, and twelvth grades. It often happens, but not commonly, that a boy is guided into that field for which he has shown the greatest tendency aptitude. Where his tendency aptitude and his choice do not agree, the guidance course enters. A personal interview may be arranged with the boy and his records gone over in an endeavor to point out to him personally the wisdom of choosing that field in which, according to school figures, he has the greatest chance of succeeding. It is a haphazard effort and does not bear out its contentions that it is the best method to give the boy first hand information of the various trades, so that he may be able to make an intelligent choice. Then, too, the though enters, "Is it not an educational theory that some of the other boys might benefit just as much from some shop work other than manual training?" That seems to me to be one of the strongest arguments for the general shop. True it may be a little more work for the teacher and it might take better trained men to handle the work, but its value to the student, and incidentally to the home, and to the community is the ultimate aim; and, if it satisfies this, then we ought to let nothing stand in the way of its fulfillment.

In the field of guidance it seems that there is very

little of that done. That which is done is done for the most part unconsciously and by individuals rather than as an organized part of the program in the school. To those who do guidance work in spite of their handicaps, all honor. But for each one who does there are many who do not, and are content to let their trade do it for them. There is very little coordination among the shops, about as much as for the teachers of specific trades. They understand their own trade and are excellent teachers of that one trade and they have a little knowledge of the others, but have made little if any effort to understand and realize their objectives. As one shop teacher stated, "Printing is the most difficult trade of all to learn and only such pupils as are of high mentality should be permitted to select it." And to quote from an electrical shop teacher, "It is doubtful if the boys learn very much from the years spent in junior high school shop as they are not of sufficiently mentality, and it takes a fair degree of brains to understand the electrician's trade." A teacher of sheet metal states, "The average boy does only the very simplest operations, and learns the use of the various machines, but as to the ability acquired for use in life as a mechanic of sheet metal, the amount learned is small. The boys do not have the ability to make the first rate mechanics,"

which is another way of saying that he wishes that they had more brain content. The poor manual training man says "There isn't a boy in my class that I would dare trust to operate the lathes, power saw, band saw, or planer. They don't pay attention and would in all probability lose a finger or hand if allowed to operate." I have mentioned these statements in an attempt to show that the group of teachers whom we call "shop teachers" have their own ideas about the type of student that is very often "wished" on them because he has not the ability to do the regular academic work.

With this idea prevalent among the majority of the shop men, it is doubtful if there is much guidance work done. The thing most apparent is to keep the boy busy, and out of mischief; and as soon as possible promote him out of the class into another, and eventually out of the school and out of the teacher's minds. Let the community take care of him, and if he gets work, very well and good! He is considered lucky, when we recall how little he did for us, If he does not get a job then we state that we expected as much, and hold him up as an example of the boy who did not work while in school, and, therefore, is now loafing. The truth of the matter is we did very little to help him fit himself for the life after junior high school, even though that life might have been life

in the senior high school. Sooner or later we may read of a boy in connection with police affairs. We very proudly relate that we had so and so in our class and even at that age he showed that he was no good, and that we constantly had trouble with him, and predicted that he would turn out to be no good, and we feel very satisfied. On the other hand, I talked with a teacher the other day who has been in the same school for the last thirty years. We were speaking of a very prominent citizen of the state. Her remarks were that she didn't understand how anybody could see anything in him. He was one of the worst pupils that she had ever had, and she had been compelled to keep him in the ninth grade for two years, and had finally promoted him for being over-age. As far as she could see from acquaintance in the class room he was no better that "so and so" who was spending a vacation in state's prison.

She is no different from many others who later read of the mishaps of a certain former pupil and can understand it all. If on the other hand she reads of the good fortune of another and utterly fails to comprehend why he has been selected by "Good Fortune" instead of others who have shown signs of greater promise. Complete understanding is a very important element in thelife of the student. If no attempt is made to understand a boy, he and the

teacher very rapidly come to verbal, if not physical combat. An attempt should be made to get his viewpoint and as soon as he sees that the teacher is in earnest to get down to his level he will do his uttermost to let him know why he can not or will not do what the teacher wishes. There are a thousand things of more or less importance that might enter into the situation and if we make no attempt to seek out the cause for the action, then it is our fault as teachers that the boy later is discouraged and follows the line of least resistance, and the next thing is crime.

Our shop teachers on the whole are excellent men. They know their subject and often others too, but there is the feeling that they have inferior material to work with and that there is very little chance for any missionary work. Their pupils will not amount to much. It is often all that they can do to secure a passable mark in a subject that is nearly all manual operation. When we realize that these men, due to the conditions under which shop is taught have disciplinary problems, that we has class room teachers would refuse to handle. Each boy works at an individual bench where he carries on his bit of work subject to supervision as often as the teacher can get around. Where for periods that are more or less dependent on conditions, the pupil is on his own and un-

observed by the instructor. How under such trying circumstances can guidance work be carried on. There have been attempts at vocational guidance made in conjunction with shop work, but it has been given by a teacher who is not a shop teacher himself, and who favors the traditional type of education.

A typical course of studies for the junior high school may be set up and from these we may compare the guidance program of the typical eastern school with those of more far sighted western schools. One offers few choices for exploration either in the academic or mechnical subjects, while the other offers choices as early as the seventh grade and increasing through the ninth grade. In the first group the electives begin to be used more in the ninth grade, but this is where they would begin in the traditional eight-four plan. The other plan is very differently organized, providing for "core" subjects and elective subjects or choices in each grade. It is through the electives that we, as guidance counsellors, are to gain an insight into the tendencies of the student.

TRADITIONAL TYPE OF CURRICULUM

**

Seventh Grade(1)

Subjects	Periods of 50 minutes
English	3)
Literature	2)
Arithmetic	5
United States History	5
Geography	5
Physiology	2
Drawing	1
Music	1
Shop (boys)	2
Sewing (girls)	2
Penmanship	1
Spelling	1

Eighth Grade

Subjects	Periods of 50 minutes
English	5
Literature	2
Arithmetic	5
United States History and Community Civics	5
General Science	5
Drawing	1
Shop (boys)	2
Cooking (girls)	2
Penmanship	1
Spelling	1

Ninth Grade

Subjects	Periods of 50 minutes
Required	
English	5
Algebra or commercial arith.	5
Music, drawing, or penmanship	2
Physical education	2

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(1) Koos and Kefauver. Guidance in Secondary Schools pp.

Elective	
Latin	5
French	5
Biology	5
European History	5
Civics	5
Shop	5
Household	5

Boston University
School of Education
Library

A NEWER TYPE OF CURRICULUM (1)

Seventh Grade

Core subjects (5 units)

English
Geography (½)
Social Science
Mathematics
Penmanship and spelling (½)
Physical Training

Elective Subjects

Nine weeks finding and broadening courses. The four finding and broadening courses must be chosen from at least three different groups.

Fine Arts
- Music
- Art
- Public Speaking

Science
- General Science
- Radio

Industrial Arts
- Manual training
- Mechanical drawing
- Bricklaying
- Automobile mechanics
- Plumbing

Languages
- Modern languages
- English-Latin

Commercial
- Office practice
- Shorthand
- Typewriting
- Bookkeeping

Household Arts
- Millinery
- Costume-designing

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(1) Koos and Kefauver. Guidance in Secondary Schools pp.

Household Arts (continued)
    Home management
    Cooking

Eighth Grade

Core Subjects (4 units)

English
Social Science
Mathematics
Physical Training

Elective Subjects (2 units)

Public Speaking
Penmanship and spelling
Bookkeeping
Typewriting
General science
Art
Music
Orchestra
Domestic Art
Domestic science
Manual training
Mechanical drawing

Ninth Grade

Core Subjects (3 units)

English
Social Science
Mathematics

Elective Subjects (3 units)

Public Speaking
Penmanship and spelling
Bookkeeping
Typewriting
Latin
French
Spanish
Physical geography
Geology
Art
Music
Orchestra
Domestic Art
Domestic science

Manual training
Mechanical drawing
Physical training

> "One may entertain doubt as to the advisability of placing certain subjects with the electives; for example, general science in the eighth grade or physical training in the ninth grade; or of certain others with the constants, for example, penmanship in the seventh grade or mathematics in the ninth grade. One may question also, the advisability of pupils of these ages of certain nine-weeks units in the finding and broadening courses of the seventh grade. But the general superiority of this program over the fore-going with respect to its service in guidance is not even questionable. A prominent element of this superiority is its more generous use of the elective features. Neither the non-differentiable needs (including the preliminary purpose of giving command of the fundamental processes) nor any need of specialization on this level, or both these needs combined, should be great enough to preclude these features." (1)

The writer feels that he would go even further in the electives offered in the eighth and ninth grades. Since these curricula do not specify that there are any different subjects given, it may be assumed that these are the only ones given and that it is expected to be well enough rounded to take care of those mentally slow (?) of which previous mention has been made. If such be the case then we should make wider use of the shops that we are to have. Plumbing and Automobile mechanics are spoken of in the seventh grade, why not put them to use in the other grades too. Let the boys of the eighth and ninth grade have them as electives in addition to the one

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(1) Koos and Kefauver. Guidance in Secondary Schools p.

of manual training or mechanical drawing. Surely, this is of exploratory as well as of intrinsic value to the boys. They can use the knowledge gained from these shops at home fully as well, if not better than that gained in manual arts.

It is a rather difficult matter to state conclusions as they concern that matter of the general shop as opposed to the unit shops. There is very little written concerning the general shop, and that field of literature written about the shop in general is inclined in its favor as an educational and vocational factor in the field of secondary education. With the first two of these fields the writer does not intend to pick a quarrel, With the Third factor, however, one that is becoming more and more important both in professions and in the industries, he does feel both personally and from the reading of the literature of the subjects, that we in our present system are not doing sufficient for the phase of education that in the long run is the most important of all. We do very little in the matter of education for character development. A recent study made by H. Chandler Hunt in his Thesis for the School of Education of Boston University lists a number of causes for many discharges from business that he investigated. John M. Brewer does the same for the trades, and the conclusions warrant one in-

clusion here, to prove the point that the writer if trying to make; namely, there is a lack of proper guidance and character education in our secondary school system, a deficiency that it is recognized by our business men and by our leaders in the trades. It is not merely the lack of skill that is the cause for dismissal, but serious character defects.

"For all the corporations reporting there is an average turnover of employees of 5.8 per cent, or approximately 4000 people. The results of the inquiry appear in the tables that follow. (1)

	Table 1 Most common causes for discharge	Table 11 Deficencies preventing promotion	Table 111 Deficiencies school must work to overcome
Lack of specific skills			
In Shorthand	2.2%	3.2%	2.9%
Typewriting	1.6	2.4	2.1
English	1.6	5.2	3.7
Dictaphone	1.3	1.6	1.5
Arithmetic	1.3	3.0	2.4
Office Machines	.9	2.2	1.7
Bookkeeping	.6	1.4	1.1
Spelling	.6	2.7	1.9
Penmanship	.0	1.8	1.1
	10.1%	23.5%	18.4%
Character Traits			
Carelessness	14.1	7.9	10.3
Non-cooperation	10.7	6.7	8.3
Laziness	10.3	6.4	7.8
Absence for other Causes than illness	8.5	3.7	5.6
Dishonesty	8.1	1.2	4.9
Attention to outside things	7.9	5.6	6.5
Lack of initiative	7.9	10.9	9.6
Lack of ambition	7.2	9.7	8.7
Tardiness	6.7	4.6	5.4
Lack of loyalty	3.5	4.6	4.1
Lack of courtesy	2.2	3.3	2.7
Insufficient care of and improper clothing	1.6	3.0	2.5
Self satisfaction	.9	4.4	3.0
Irresponsibility	.3	.8	.6
Unadaptability	.3	1.4	1.0
Absence due to illness	.0	2.4	1.5
	89.9%	76.5%	81.6%

"Our schools should not be turning out pupils of such character that they are discharged for carelessness, non-cooperation, laziness, etc.,Isn't the answer to the problem some form of character education--and guidance?

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(1) Hunt, H. Chandler. Opportunities for Character Education through the teaching of Commercial Subjects. Bodton University School of Education. 1932

THE GENERAL SHOP

The purpose and use of the general shop has been well stated by Proffitt.(1)

> "The general shop, which is a recent type of organization for teaching elementary work in a number of shop activities under the direction and supervision of one individual, has been growing in favor, especially for some of the manual arts work on the junior high school level. The number of schools adopting this general shop plan has increased rapidly during the past two years. Of 1,500 representative school systems furnishing information to the Bureau of Education on this point, more than forty per cent report that they have organized a general shop course. More than one fourth of these were inaugurated during the past two years, and ten percent of all the schools having general shops started them within this period.
>
> The majority of these general shops are organized on the plan of a single comprehensive shop to include work in all the activities offered in the course, rather than on the basis of a cycle of shops, through which the students are routed as a group for a limited period of work in each activity. The comprehensive plan makes it possible for a pupil to work continuously on a project involving more than one activity until is is completed. Instruction is based upon the development ofprojects rather than upon a plan to teach the beginnings of any trade. The philosophy underlying the general shop course is the same as that for a general course.in science or a general course in mathematics. The aim is to give elementary instruction in a number of more less related lines of work, and on a basis corresponding to the interest and ability levels of the student, rather than to carry instruction in one branch into advanced stages."

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(1) Proffitt, Maris M., Industrial education in 1924-26, pp. 9-10 United States Office of Education Bulletin, 1927, No.29, Department of the Interior, Washington, D.C.

The work of the general shops may be organized in many ways. It may be built around the projects that are carefully planned, or it may be built around short units. The projects draw from a number of trades for the completion of the project. Under the short unit plan the groups of students would work together on a trade with periodic shifts from one trade to another. The work of the student in this respect is not unlike that of the student in the specialized shop, save that his shifts do not take him into another shop where he and another shop teacher may get acquainted. This getting to know each other is a wastefull thing. It is primarily on that basis that many schools have ceased to promote bi-annually. Now we feel that it takes a term to know the pupils, and that it is unfair to the pupil, and the teacher, to take them from that teacher just when they may be settling down to do their best work. If that is true of the academic subjects, why isn't it just as true for the arts courses. There, possibly due to the free-er latitude that is necessary in the class, it may take even longer for the pupil and the shop teacher to get acquainted so that each knows the other's "weaknesses."

If the function of the junior high school is for exploratory purposes, then the general shop fulfills this objective even more amply than does the specialized shop.

A combination of the general shop and specialized shops may be set up by using the general shop in the seventh grade, short-unit try-out courses in the eighth grade, and longer periods of specialization in the ninth grade. A number of different combinations can be made with these three types of arrangements. The series provides for exploration followed by more intensive experiences with certain occupations, and still more intensive work in the ninth grade. Time alone decides the number of occupations explored. The requirement for students does not in most schools extend beyond the eighth grade, and in some systems not beyond the seventh grade. If we allow half a semester for each occupation the pupil can make contact with eight during the two year period. In the same bulletin quoted previously, Proffitt lists five commonly included groups of activities:(1)

Group one. Metal work: Sheet metal, forging, machine work, auto mechanics, and foundry.
Group two. Woodwark: Carpentry, cabinet making, and pattern making.
Group three. Electricity: House wiring, motor and dynamo operation, and automotive electricity.
Group foмr. Drafting: This would be correlated with all the others.
Group five. Printing trades: Hand composition and press work.

It is of course impossible that all these activities be covered in a single program, but we can select and sample from each group. Proffitt sets up the following as an example of what can be done for the three years of the

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(1) Ibid. p. 16

junior high school with one shop teacher. (1)

Seventh year

Carpentry and drafting; one semester.
Sheet metal: one half semester.
Electric wiring; one half semester.

Eighth year

Pattern making; one half semester.
Forging; one half semester.
Auto Mechanics: one semester.
Drafting correlated with all shop work.

Ninth year

Machine shop, auto mechanics, auto electricity, drafting.
No specified time for any one activity, but all are correlated.

There are a considerable number of schools that have installed the general shop program. Some have had up until that time the regular specialized shop program and have had to make over their shop to the general type. This is not always successful as the layout of the room space may not have been sufficient. Then too often the rooms are in the older building in out of the way inacessable places with poor light, and few facilities for proper teachings.

The program as followed at St Cloud, Minnesota, (2) will serve to illustrate one type of plan sometimes used. The work begins in the seventh grade and it is required of all seventh grade boys. There are six exploratory courses with each course six weeks in length. The titles

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(1) Ibid. p. 16
(2) Friese, John F and others. Manual Arts in the Junior High School: Board of Education, St. Cloud, Minnesota, 1925.

of these six units are as follows: Exploratory Mechanical and Architectual Drawing Course, Exploratory Woodwork Course, Exploratory Electricity Course, Exploratory Automotive Course, Exploratory Printing Course, and Exploratory Machine Shop and General Metal Work Course. This year of six week exploratory courses is followed in the eighth and nin th grades by six half-year elective courses. The titles of these courses are Machine Shop, Woodwork, Electricity, Automotive, Printing, and Mechanical Drawing. The second list are specialized extensions of the exploratory courses.

This course that is used in St Cloud is only one of a great number of somewhat the same type. The prime objective, that of exploration, which is one of the objectives of the junior high school is certainly met here. The opportunity to explore is given the pupil in the seventh grade and if he has any choices he may make them there.

I believe that we could insert the element of guidance here once more. It is known by all teachers that many students select courses that are reputed to be "snap" courses, or because such and such a teacher is reported to be "easy" or because their friend is taking that course. Very often that is the major motive behind the selection. A boy may have no aptitude for the work at all but simply

selects that particular shop because the group with which he is most friendly are all to take that specialized shop. Here the shop teacher has the golden opportunity to personally guide and counsel these boys who having gone through their exploratory work have shown that they have no ability along that line at all. In this sense the guidance does not stop at being simply vocational or educational guidance. It is character guidance and education too. The boy's character in certain elements is being built up to the point where he does not begin to rely on others to make his decisions for him but is able to analyze himself and his own potential needs. Thus he directs himself into that field where he will have the best chances of becoming a success.

A trait such as carelessness, is one very easily built when a boy is not interested in the work save that he is with the "gang", and his work shows that lack of ambition which is still another trait. So we might go go through the entire list of character traits and show how each might be made worse by continuance in the classes in which he had no interest. Such a plan for guidance therefore, is not simply guidance, but becomes at once a field for character education. The common mistake is that we have our guidance plans and character education plans for the academic groups, and forget all about

the arts group who possible need it just as much, if not more, than our upper graded groups.

THE SCRANTON PENNSYLVANIA PLAN

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The Scranton Pennsylvania General Shop plan has six basic trades as its plan of organization.[1] These are:

(1) Machine Shop Practice (5) Woodwork

(2) Plumbing and Sheet Metal (6) Printing

(3) Auto Mechanics

(4) Electricity

They give four options based very largely on the size of the school system.[2] These are:

1. For schools containing 100 to 200 boys: Option No. 1-one general shop, one drafting room (class room will do); Option No. 2-Large room containing both.

2. For schools containing 200 to 400 boys: Option No. 1-one general shop (containing wood and electrical work), one drafting room (classroom will do): Option No. 2-One general shop (containing four or more activities), one unit shop (where vocational specialization is needed), one drafting room.

3. For schools containing 400 to 600 boys: Same as for smaller school with the addition of another unit shop (electric or other suitable for Smith-Hughes classes).

4. For larger schools:
   a. For schoold of large size one shop will be needed for each 200 additional boys or considerable fraction of this number.
   b. Vocational work which may beelected in the ninth grade will use one unit shop for each 40 boys.

No matter what the plan used there must be an adequate amount of time alloted to the subject for it to be of any value whatever. The following is a summary of

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(1) Crickard, Geo. E. and Hanneman, Geor. Plan of a General Shop for the Scranton Junior Schools, June, 1928

the time to be allotted in the Scranton Plan:

A. School weeks in the seventh grade ---- 36

Weeks devoted to each unit ---- 6

Periods per week in each junior high school ---- 30

Periods per week for shop work ---- 5

Total yearly hours per unit ---- 30

Total yearly hours in shop ---- 180

In this above there are some items about which one might seek more information; notably the time of the school day, This answer will effect the time of the periods; by that we mean the number of minutes spent in the class room. Are these periods to be double periods as many feel is absolutely necessary or are they to be single periods occurring each day of the school week. If this is true as the outline seems to indicate, then it seems that some time will be lost from the class work in the filing to class and getting ready to leave for the next class. In all a much more efficient time arrangement could be made.

Another item that is of value in comparison is the number of pupils that are involved in the plan. According to the figures given that are in the junior high schools of Scranton 339 boys, each succeeding year showing an increase. The plan that is outlined here has allowed for expansion, its maximum enrollment being 432

students.

It is recommended that there be three instructors, each of whom will teach two units of the six to be taught. The students are to be divided evenly among the six units, all of which will operate simultaneously. For example; assuming a maximum enrollment of 432 boy students, each instructor will have been assigned 144 boys. As there are 30 periods to a school week and each boy is to have five periods of shop, each instructor will have six classes to teach. The maximum teaching load with an enrollment of 432 students is 24 pupils. As each instructor has two units to which his boys are to be exposed, he will assign 12 boys to each trade. As a result, there will be in operation at one time, 6 subject units, 72 students, and three instructors.

There is a difference of opinion concerning the matter of grouping. There must be some basis on which these subject trades shall be grouped. This I will discuss later under the curriculum. The Scranton plan groups them into three unit groups. These are:

1. Machine shop, plumbing, and sheet metal work.
2. Auto mechanics and electricity.
3. Woodwork and printing.

In arranging this grouping it is interesting to note the reasons for the grouping as given by the proponants of the

Scranton Plan:

First, the grouping was done to facilitate the obtaining of instructors who have had experience in two trades. Mechine shop, plumbing, and sheet metal employ certain fundamental processes which are related. Likewise, suto mechanicis and electricity go hand in hand. The woodworking and printing are the only subjects in which no correlation is to be found. However, it is believed an experienced teacher of woodwork, or of printing could adapt himself or fit himself to the scope of printing which is to be taught to seventh grade boys.

In the making of this plan there was some difference of opinion as to the advisability of having partitions between the subject units of one instructor and another. Some favored the use of portable partitions and justified their reasons as follows:

1. Instruction not disturbed by other unit activites.
2. Pupils attention not attracted by other units work.
3. Character development greater in smaller groups.
4. Instructor's personality as a guiding influence as far stronger in the segregated group.

It is interesting to note that some of these instructors felt that the guidance values and character development program was more effective in the small group.

The opponents of the partitions claim that if a gen-

eral shop is to be of value, it must strive to operate its program so as to give experiences similar to those on the real job. The modern trend in industry is the merging of small shops into great combines. Shops are built on a huge scale; commodities are produced in an atmosphere of the finest kind of cooperation. By the way, isn't it likely this spirit of industrial cooperation will carry over into community, state, and national cooperation? Isn't this educating for character development? A large room in which there are 72 employees (students) engaged in the work of six trades (the general shop) over which three foremen (intructors) guide the building operations, savors of industry, as found outside the school. If our objective is getting boys ready to choose wisely for the future, let us permit boys to observe, do things and think about the future in a shop whose construction and methods are built for the future. This plan is now in operation successfully in many industrial schools where a general shop is used.

The next most important item is the course of study. The Scranton Plan lays the emphasis on its objective that the most important thing is outlooks and overviews rather than intensive training on a few experiences. The material which can be used is endless in scope and variety.

Newkirk and Stoddard give many examples that I will speak of further under the curriculum. Out of each trade branch a multitude of occupations, all of which are related to the trade. For instance, a boy having contact with the principles of machine work may choose lathe work, tool making, production study, the chemistry of steel, foundry practice, etc. This wide choice is typical of all trades. The importance of teaching concrete in a woodworking course should be considered, likewise other related phases whose material is useful and usable. The progressive instructor will have little difficulty in knowing what to include and what to leave out in the course.

Some courses say considerable of what they term projects. This terms has been greatly overworked. It is used in some types of academic work and while it takes considerable time for the pupil to complete seems to have verylittle educational value. To illutrate; some history teachers use what they term project method and have their classes very busy at all times with the completion of these projects. If they are studying the war of 1812 they have the class make a number of paper models of the Constitutuion and have the sails open out like the leaves of a book and on these have printed very neatly the course of the war on the sea. Or the causes of the war are printed on these. The amount or correlation between subject

matter and the completion of the project is poor. In the arts work, however, that is not true, and there is close correlation since the work is manual.

RICHMOND, INDIANA

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The following is a summary of the type of general shop plan that is used in Richmond, Indiana: There are here located;

1. Woodshop.
2. Drafting room.
3. Metal shop.

The plan of this school shown in the appendix indicate the following usual equipment for the woodshop. There are some disadvantages as noted:

A. Lack of storage space for materials
    1. Lumber
    2. Small equipment
    3. Supplies in general

B. Lack of storage space for problems
    1. Under construction
    2. Finished

B. Lack of floor space
    1. If different activites are to be carried on in the shop, floor division must be made to suggest different activities.
    2. Shop should contain two more wood lathes and one or two more machines.
        (It is stated that a large number of the boys enter industry from the junior high school.)

Under the drafting room it will be noted that this is used for general purpose drafting and conference room. The drafting is not taught as drafting, but as one of the shop's activities. The room has glass partitions and

would be adequate if there were storage space provided, other than in this room.

The metal shop lends itself better to the general shop program than the woodshop. This shop contains small equipment for sheet metal, forging, bench metal work, electrical and a little machine work. This shop functions much better than the woodshop because of the smaller floor space needed by each individual boy to carry on his work. It does lack in space for storage, however. This shop should have two more engine lathes.

The sequence of courses is as follows: In the shops two groups are handled. Under this plan election of junior high school courses takes place at the close of the seventh year. This gives the shops the practical arts group and the group making some other election.

All 7B grades take 2½ hours wood work
All 7A grades take 2½ hours wood work

The practical arts elective students take courses in the shops as follows:

8B grade, five hours wood work
8A grade, five hours metal work
9B grade, five hours wood work
9A grade, five hours metal work

The students electing other courses than practical arts take the following show work:

8B grade, five hours wood work
9A grade, five hours metal work

One feature worthy of note in this plan is that they do

not try to consider the work as seventh, grade, eighth, or ninth grade work, but the entire time that the boy spends in the shop is treated as one experience. The aim is not to route the boy through any given set of problems at any particular time, but rather allow the boy to do his own routing. However, the boys in the seventh grade class in metal-working do largely sheet metal work, and in the wood shop the seven B boys get elememtary work, If the general shop is to function as a general shop, regular routing can not be demanded. It is not natural education with the boy. An attempt is made to have the boys have some experience with every branch of work offered as soon as possible. Actually some boys do not see the need of doing certain kinds of work, they learn to a certain extent by seeing others doing it.

From the summary of these two types of general shops it is fairly easy to draw a conclusion as to which one of the two is the better organized. One is in operation, however, the Richmond Plan, and the other is simply the proposed plan that is to be put into operation. Naturally each one learns by the mistakes and errors that some other one makes. It is far easier to make the building fit the plan when it is being built or additions are being contemplated than it is to take a building that is already in operation and has been for some time and attempt to

remake the floor space over into a plan that was not meant for it. However, to quote from the words of those who are handling the Richmond Plan, they believe that in a small school (enrollment runs around 500) there is an advantage in flexibility, and economy in equipment and in operations, and the opportunity to range in projects and methods from the work limited to one field of practical arts to the project requiring work by the boy in several fields. There is nothing in the general shop layout or equipment to prevent a group or whole class spending a period of time on projects limited to one field, or where that seems most desirable. It is the feeling of many that in the smaller schools (500) from the point of try-out and guidance, and we might add in character building, that it probably does a better job than the short unit or specialized course in several lines. It is also felt that there is an advantage in showing the boy how many different lines of work are brought together in the making of one product.

In many school plants there is an undue amount of floor space given over to the industrial arts as they are called. It is, therefore, quite essential that in spite of the limitations the public school opper outside of vocational education which the larger schools are justified in providing, industrial courses that can be

appreciated. The supply of qualified teachers, the length of the instruction period, and the general atmosphere of the school are all factors that must be considered. Without in any way casting reflection upon many able teachers who are employed in this work, the fact remains that, while many are master workman, the majority are not. The periods of work in industrial art are short, though they may be as long as the pupil's time and physical strength may permit. The size of classes cannot always be restricted to the number that can best be served by one instructor, but must be governed largely bu such considerations as are determined by the general plan of the school organization. If the class units are large in the other departments of the school organization, it brings about a similar situation in the department of industrial arts. Most pupils will begin their work in industrial arts about the age of twelve when they are influenced more by impulse than by deliberation. Thus, there is all the more responsibility on the educators to see that the impressions that the pupil receive at this time are of the correct type. Here is where the character building of the child has an important place in his education. It has an advantage in teaching individual responsibility, and helping to guard against errors and poor workmanship due to laziness or disinterest.

There have grown up standards of minimum essentials for the industrial arts, and at present four states have gone on record as being in favor of these essentials and have issued bulletins for the guidance of schools in the state. These states are New York, Minnesota, and Pennsylvania. I have already outlined in some detail the plans of one of the schools in Scranton, Pennsylvania, and one in another state, Indiana, where no standards have been set by the state. In New York the bulletin contains the following requirements: (1)

NEW YORK STATE SPECIFICATIONS

1. Floor space for shop 1600 square feet, for shop with recitation space 1650 square feet, for storage and supply closet, 100 square feet, for drawing room 1200 square feet.
2. Partitions for separating all shops and drawing rooms, walls that can be moved easily, should it be deemed advisable in future years to readjust the original layout.
3. Light and power: daylight from one side, if possible, large windows placed close together as in factory construction, individual light for all benches and machines, if other system of lighting is not adequate; outlets for all electrically driven machines; daylight proof curtains and wall sockets for lantern in all rooms used exclusively for instruction or for drawing and recitation.

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(1) New York State Bulletin on Industrial Arts in the Junior High School

4. Blackboard: each shop and drawing room should have 80 square feet of blackboard.

5. Corkboard: each drawing room should have not less than 80 square feet of corkboard.

There should be a complete though perhaps a limited supply of reference books dealing with the various types of work being undertaken. These should be for the pupil's use rather than for the teacher's.

MICHIGAN PLAN

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The bulletin that is issued by the Department of Public Instruction of Michigan is not specific in regard to the size of rooms, but is very complete in its enumeration of the equipment needed for the work.(1) In the junior high school prevocational manual arts work should begin. Throughout the junior high school its aim is distinctly prevocational and, therefore, as many different lines of work as possible for tryout purposes should be provided.

In the smaller cities where only one shop can be provided, that shop should be a general shop providing, in addition to the usual wood working equipment, facilities for teaching household mechanics and elementary electrical applications in the home. He scope of such a shop can be greatly increased by the addition of a metal turning lathe, a soldering and riviting bench, and a forge and anvil. One end of the shop may be used for auto mechanics. In cities in which a vocational course in agriculture is taught, farm mechanics should be part of the household mechanics course and for this purpose wood working, metal working, and auto mechanics are well adapted.

In the larger school systems where two shops or more

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(1) Bulletin No.52 Department of Public Instruction of Michigan. School Buildings, Equipment, and Grounds.

are possible, one should be a general shop and the others should provide more advanced work in metal, electrical work, auto mechanics, and printing.

Here, in this plan is set forth the nearest to the possible ideal course. It is stated that in the smaller communities that it both an economical procedure and also educationally sound. This argumant has been advanced by many who hold forth that it is the solution to the problem the small town that desires to give courses in industrial arts but it lacks the facilities and the money to put into practice the specialized shops of the larger and wealthier cities. Hence the general shop for those communities. Here in this bulletin is advanced an argument that is sound; that is both educationally and psychologically shound for the larger cities that can support two or more shops. Here the function of exploration is served for the junior high school, and also the additional training for those who seek more specific training in one field. Of course it is still in the field of household mechanics that all this training should function, and should not be of the specialized trade variety that one expects of the trade schools. It does not at any point mention the size of the classes or the number of hours that should be devoted to the industrial arts. The matter of curriculum is left to the individual school and like-

wise the number of periods and hours. These, however, should be of sufficient length so that the exploratory and guidance program shall have scope to operate. Here again the age of the student enters, and the routing of the pupil through a set program in opposition to his desires is debatable character material. Thus, the elements of character are present.

MINNESOTA PLAN

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The minimum requirements for Minnesota are found in a Bulletin issued by the Department of Education of that state. (1) This, like that of New York, devotes considerable space to the floor plans and space required for the industrial arts program. The arrangement of the curriculum as in Michigan is left to the school to determine.

The space provided for general industrial work will depend very largely on the amount and variety of the work to be offered, but in no case shall the floor area be less than 1120 square feet. The space provided may be left in one room or may be divided into separate rooms in accordance with the local requirements. Here again we come back to the Scranton plan with an option provided.

Whenever power is to be used, provision must be made for proper connections. Any special feature required by special types of work-- as gas exhaust flues or dust collecting systems-should be provided for when the building is constructed.

A door opening, eight feet wide, with double doors should be provided, giving access to this department from outside, making the whole opening available for the bringing in of large equipment of materials to be worked upon.

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(1) Laws and Rules Governing Buildings and Sites. Division of Building and Sanitation. Department of Education. State of Minnesota.

Too, if there is to be an auto mechanics shop this same opening can serve as entrance to that shop.

Storage rooms adjoining the main room are desirable. The essential idea underlying the planning of the General Industrial Room (General Shop) should be that of making it possible for the instructor to keep in continual touch with all the work going on.

One interesting feature is that glasspartitions are suggested. This provides that pupils may be working in all parts of the shop at one time and still be under the supervision of the instructor.

The writer believes that from the plans surveyed that the composite, or general shop, is the one preferred. This view is not determined only fom the plans reviewed but from the periodical literature on the subject. The aims and ideas with regard to industrial training have undergone a marked change within a very few years. From a centralized interest along one line of industrial work we have gone into diversified activities, much after the fashion of the progressive grain farmer who has gone into diversified farming. The composite or general shop, with its broader interests and its revelations of useful occupations presents a much larger and better educational appeal. It is more in keeping with the general tendency of the present educational program.

One very interesting shop with the work under the direction of one instructor is the shop for home and community occupations, suggested by the State Department of Education for California. The various industries to which the pupils are introduced include home carpentry, concrete construction, furniture repair, upholstery, shoe repair, electric wiring, sheet metal work, plumbing, iron work, auto repair, agriculture and applied science.

In Hackensack a type of general intruction that takes in all the matter taught was used. A steam engine was made that permitted simple operations in wood, sheet metal, forging, pattern making, foundry (casting in soft metal), wood-turning and thread cutting. Group instruction was employed with a foreman in charge of each group. Each group rotated from one activity to another. Consequently, all had a sampling of the medium mentioned. With this same project came the development of drawing and mathematics invloved with the problem and the study of the science related to the project.

This utilization of the project that takes in all the phases of the general shop is one of the shief attractions that that form of teaching has over the specialized shop where all the operations are of one type. In Montclair, N. J. an opportunity for making toys is considered of inestimable value. In their school shops

are many water motors which will actually drive light machinery; beautiful miniature yachts made to comp~~l~~ete in the yacht races given each spring. There are to be seen motor boats, steam engines, telegraph sets, bells wired, and ingenious inventions which boys have contrived in order to make their toy boats a bit unusual. In going through this room a visitor exclaimed, "It is a child's paradise." Is it sound?

That which we wish to do, we do well, and that we do because we are told to do so, and in which we have no interest, we do poorly. That then is not building character, it is breaking it down. But, say many, there will be situations in life when these same boys will have to do many things that they do not wish to do. If they have been taught to do only those things in which they are interested, and to do a good job in those alone, it is only right that they have instilled into them the will to do things well that they may have no interest in doing. But why start at that age? These boys of the junior high school are still young. More and more is the school taking over the functions of the home in character building and moral training. Instead of the harsh compulsion to do the thing, is it not better that they be led gradually to do the thing well that they like first, and then if the program is of value, it will skillfully lead them to do

the things in which they may have little interest at first, merely in the desire to do a good job.

There are no new teaching devices, if that is what some persons are looking for in the general shop program. They are all old and have been tested and tried in the other branches of the school for some time. Some of them have not been applied to the shop, and especially to the general shop, since that is comparatively new. These procedures are worthy of consideration since it is through their refinement and proper application that the general shop attains its highest efficiency. Newkirk and Stoddard list the following as the teaching devices employed in the general shop.(1)

1. Individual Instruction
2. Group Instruction
3. Class Instruction
4. Demonstration
5. Reference Materials
6. Talks by Professional and Business Men
7. Objective Tests
8. Moving Pictures and Slides
9. Charts and Pictures
10. Class Excursions
11. Individual Instruction Sheets

Let us discuss each of these devices a bit before we go on. Every teacher will readily see that he has at some time used some if not all of these methods in teaching his classes. Their application to the academic work is readily seen. Some forms of academic work utilize more of these devices than do others, but all are used

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(1) Newkirk and Stoddard. The General Shop p.50

to a greater or lesser degree. Their application to the arts work should make that phase of the educational field of more value.

The great difficulty with the first phase is that the shop teacher with his larger class has had to depend largely on written instructions, and has had to devot a considerable time to routine tasks about the shop. The general shop aims to do away with this partially, and enable the instructor to devote a considerable part of his time to the individual needs of the members of his class. This gives the teacher a fine opportunity to do a splendid piece of character education and guidance with his class.

Often there are several boys who may be having the same difficulty with a particular phase of the work that is being carried on. Rather than utilize time that might be of more value later, group instruction could be used and time saved by calling these boys together and giving them the benefit of additional instruction. Here, too, long contacts with individual members is to be avoided.

Class instruction, being the type that is most used for academic subjects, needs little explanation. The chief difficulty is that it will be too much used in the shop instruction to the disadvantage of other and more valuable types. There are, however, certain phases of

instruction that the entire class should be given the benefit of. When the entire group is starting a problem, it is essential that it be thoroughly understood by all and at this point class instruction plays it piece. Some guidance can be done here as well as certain bits of character and moral education. Never at any time should class instruction degenerate to mere assignment and lesson learning.(1)

> "Teaching in the practical arts has had one great advantage over teaching in most of the so-called "academic subjects." It has never been susceptible of the lesson learning type of treatment. No matter how formalized the teaching may have become, in the end learning must always perforce be direct learning and not lesson-learning."

The pupils should spend the major portion of the time as an active gatherer of knowledge under competent supervision.

Demonstration is a method used often in academic work, and is one of the major methods used when presenting to a class a new manipulative device which the entire class is soon to use. Usually a short time is sufficient for the demonstration, but it is often legitimate to use an entire period in order to cover the essential parts of the projects before they are assigned to the individual members of the class.

Previously, in one of the plans discussed it was recommended that a complete set of reference books be kept a-

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(1) Morrison, H. C. The Practice of Teaching in The Secondary School. p.416

vailable for the use of the students, not the teacher. This is valuable, but the projects should be so arranged that it is unnecessary for the student to go to this source. If it is deemed advisable, additional work for credit or for reports can be given to those who show the most promise. The job sheets that are given should, however, contain all the information that is essential to the unit of instruction that they represent.

Outside speakers are valuable if they can be made to talk on the phase of the subject that is applicable to the student's interest. It is usually an easy matter to secure these speakers. They deem it an honor to come and talk to the students. An arrangement must be made beforehand, however, and the points that are wanted should be given to the speaker so that he will not go too far afield. What is not wanted is a rambling talk of the man's interests and general philosophy, but a rather clear account of certain aspects of his work directly related to the activities of the class.

Objective tests are to be used in shop as well as in academic classes. It is desirable that teachers know the results of their efforts in shop work as well as in subject matter.

Moving pictures and slides are valuable as aids to teaching. Their value is still being proven. There is

no doubt, however, but that in certain types of learning the visualization of a process is an aid and cuts down the time of class instruction. As the 16 millimether film comes more into use, the motion picture is sure to play a more important role in general shop instruction, for much of the material of the general shop lends itself admirably to pictorial description.

Numerous charts are available from tool companies specializing in school equipment. Interesting charts are obtainable from manufacturers and merchants by making contacts with people who are apt to receive advertising materials.

Excursions are liable to be a more or less complete failure unless they are carefully planned in advance and those things which the teacher wishes the class to note are spoken of previously.

Individual instruction sheets are absolutely essential to the teaching of a well organized general shop course. It should be kept in mind, however, that individual instruction sheets are designed to supplement the instruction and not to take the place of the teacher. Selvidge (1) sums up the chief characteristics of individual instruction sheets of the better types under four heads

1. Operation Sheets

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(1) Selvidge, R.W. Individual Instruction Sheets in The General Shop by Newkirk and Stoddard. pp.57-58-59

2. Information Sheets
3. Assignment Sheets
4. Job Sheets

OPERATION SHEETS:

1. The purpose of operationssheets is clearly stated in the title; "How to Thread a Pipe."
2. Operation sheets are based upon units of instruction of the trade involved in work jobs, and not upon jobs.
3. The instructions for performing the operations are given step by step in a very complete form.
4. Illustrations are given to clarify written instructions.
5. Questions are designed to make the student seek the reasons for doing a thing a certain way.
6. Only the information necessary for performing the operation is presented.
7. A list of the tools and materials required is not given for it is part of the job sheet.
8. Operation sheets are applicable to any job in which this unit of instruction is involved.
9. The student is left the job of analysing his job and planning the order of procedure in doing it.
10. As a part of the job plan the student determines the tools and the materials required.
11. They give references to available sources of information when such information is needed.

INFORMATION SHEETS:

1. A specific statement is made of the subject treated in each; "The Characteristics and Action of Lubricants."
2. The information is given in brief statements and without discussion.
3. Problems may be presented with the necessary information for their solution.
4. References to available sources of information are given.
5. Questions are given to act as a guide in reading and observation, and to form the basis of class discussion.

ASSIGNMENT SHEETS:

1. A definite statement of problem is given.
2. Sources of information are stated with exactness.
3. Questions are given to direct the reading, observation, and thought.
4. Provision is made for written answers to these questions.

JOB SHEETS:

1. Job sheets are prepared for specific work jobs and the intructions are given for these jobs and no others.
2. They give the list of all tools and materials required for the job.
3. They give the plan for doing the job, listing the steps in their order.
4. They give instructions for performing certain operations involved in the job.
5. They give illustrations to clarify written instructions.
6. They present the information as a part of the job.
7. They give questions concerning the job.
8. References toavailable sources of information are given.

These teaching devices are a summary of a great number that have been made from time to time by various shop men. It is only natural that there are some features that many shop men will feel should be left out as not being applicable. There are some who will wish to add to this list. Selvidge does not claim that this is perfect. All he states is that this is a summary of some of the chief items that he has found to be common in the great number that he has studied. Any shop man who is thoroughly acquainted with his own field, and who knows the conditions of the community in which he works, can, with sufficient study plan out his own work, and so place it before his students that he gives them the greatest benefit.

One of the devices that is spoken of is the job sheet. This is again subdivided by Newkirk and Stoddard (1) into four divisions;

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(1) Newkirk and Stoddard. The General Shop p.58

1. The job sheet;
    a. Name of the job
    b. Instructional aims
    c. Essential knowledge and related information
    d. Tools and materials
    e. Procedure
    f. Objective questions
    g. References

2. Procedure Cards:
    a. Name of job
    b. Step
    c. Key

3. Job Plan Sheet;
    a. Pupil's Name
    b. Job Number
    c. Job Specification
    d. Total Time
    e. Unit
    f. Mark
    g. Tools
    h. Materials
    i. Procedure
    j. Questions

4. Objective Questions;
    a. Procedure type
    b. Completion type

One plan that is used is this; before the pupil is given the job sheet, and after he has seen a short demonstration, he is given a set of procedure cards, and a job plan sheet (blank spaces) for his particular assigned project. He is asked to sort the procedure cards in the correct order and fill in the job sheet down to the questions. This plan forces him to organize his job and at the same time enables the instructor to cleck his work thus far accurately and with a minimum of time.

The pupil has very little chance to gues the procedure, since with a job that has six or more steps, there is always the possiblity that he will get many wrong by guessing. It is only after the student has completed the requirements of the job sheet correctly, that he is given a job sheet and told to go to work. The questions of objective nature on this sheet may be combined with the questions from other job sheets of a similar nature to make up a diognostic achievement test. The following is a plan sheet from Newkirk and Stoddard.(1)

JOB PLAN SHEET

Name______________________Job Sheet Number________

Job Specification__________________________________

Date Begun________Date Finished_______Total Time______

Division________________________ Mark_______________

TOOLS	MATERIALS
1.__________________	1.______________________
2.__________________	2.______________________
3.__________________	3.______________________
4.__________________	4.______________________
5.__________________	5.______________________
6.__________________	6.______________________

Procedure: Indicate the correct order of the steps for doing the job by placing the key letters from the procedure cards in the parentheses to the right of the step numbers.

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(1) Ibid

1.________
2.________
3.________
4.________
5.________
6.________
7.________
8.________
9.________
10.________

Have the work checked and get Job Sheet.

Completion Questions: Insert proper words for completing questions on Job Sheet.

1.________ ________ ______ ________ ________
2.________ ________ ______ ________ ________
3.________ ________ ______ ________ ________

Procedure cards are small cards having printed on them the job, the step in the process, and the key letter. There are a number of examples of procedure cards given by the authors of the General Shop.(1)

JOB: TO prepare ready mixed paints for immediate use.

STEP: Return the liquid, gradually stirring as you pour.

KEY: (E)

Another type that is given is that requiring the application of a lacquer finish. After the procedure cards have been filed in the correct order, and all the preliminary steps have been taken, then it is time to give an objective test to check on a subject matter. One such is by Newkirk and Stoddard.(2)

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(1) Newkirk and Stoddard, The General Shop p.61
(2) Ibid p.67

OBJECTIVE QUESTIONS:

1. Lacquer should not be left in an open container as it ______________rapidly.
2. Lacquer may be used in finishing________,________, and __________.
3. Lacquer may be most easily applied with an ________.
4. Lacquer will dry from________to________minutes.
5. Because of the danger, lacquer should never be applied in a room where there is a________.
6. If lacquer becomes too thick, stir in some_______.
7. Lacquer which dries quickly is________to apply.

KEY:

1. Evaporates
2. Furniture; floors; automobiles
3. Airbrush
4. 30: 60
5. Fire
6. Lacquer thinner (or banana oil)
7. Difficult

The few examples at random that have been shown are simply the basis of what could be worked out on a more complete scale by any one instructor in his own shop. It needs an analysis of each project. that is comtemplated, its division into the units that make up its construction and once more their subdivisions into even smaller teaching units. The entire process is a minute study of the project, and its divison into operations that can be easily seen by the young student.

The cry that one meets from the average shop instructor of the specialized shop is that he can not see that there is any more time for the individual under the general shop than under his present plan. That is to a cer-

tain degree due to poor management, that can possibly be slightly corrected in some situations, but very thoroughly corrected in others.

No instructor can use time to get sandpaper for one person, a tool for someone else, a piece of stock, for another, and so on ad infinitum. Management will be considered under the following heads:

1. Care of supplies
2. Shop-foreman system
3. Shop-numbers
4. Tool arrangmeent
5. Record system.

No teacher can afford to take valuable time from the class instruction, group, or individual to perform errands for some members of the class. This is all that one does when he allows himself to get sandpaper, start the glue pot boiling, cut out a piece of stock, etc. He should have some member of the class responsible for the small articles that will be needed from time to time by the class, and it shall be understood by all that that one person is responsible for material. Each signs for such material as he takes it or it is given to him by the foreman, and the instructor can check these with his stock. It is of little trouble to concentrate the small supplies in one spot where they can be readily obtained. The larger supplies and stock should be checked beforehand and made available for the class period.

There is educational as well as character value in selecting a foreman to act for short periods of time. He is responsibile for checking tools, supplies, and attendance. It gives him a sense of responsibility to his classmates. The duties need not occupy all the time of the boy, and they are to be in addition to his regular class work. Many shop teachers make a mistake in allowing the boy to do nothing else but act as foreman. The result is that he has considerable spare time on his hands, and this is a bad feature. By changing the boy often his class work will not suffer, and the social value is great.

Another system that is used in many shops, and also in industrial plants, is the number system. Here each is given a number or set of numbers, and for each article that he is given from the tool room, supply room, etc., he gives in return a number which is hung on the hook from which that particular tool was taken. It is then an easy matter to check the missing tools at the close of the class period. There is so much personal contact among the members of the class and the instructor, that the objectionable feature of numbers is of minor value, and should not be considered.

There are so many methods for tool arrangement and

checking that I will only mention several that have proven to be of value. It should be left largely to the shop instructor as to the method that he deems best for his particular groups of units. One arrangement is to have individual cabinets. This places the responsibility on the boy at that bench. This, however, is expensive and some shops can not afford to have that many sets of tools. Then there is the method of having wall cabinets conveniently located with the outline of each tool painted on the background of the cabinet. Then there is the tool room under the charge of one boy who is responsible for all the tools there.

In the preceding paragraph I have spoken of the methods of checking that could be used. A supply of checks is given each pupil with a number. That is his own. When not in use they are locked up in the check cabinet and each hook must show the correct number of checks at the close of each class. When a boy goes to the cabinet to get a tool he hangs a check on the hook provided for that purpose; at the close of the class he returns the hammer, or what ever he has taken, gets his check, and hangs all his checks in the check cabinet. These can be very easily checked by the class foreman. No time is lost for the instructor, and more can be given to individual needs then heretofore.

Infromation concerning individual pupils should be kept at all times.[1] This should show the following:

1. Name of pupil
2. Shop number
3. Attendance
4. Materials used
5. Progress sheet
6. School marks

These sheets can be made in the school print shop on heavy paper and kept in manila envelopes and filed in the cabinet. The following have proven valuable in the comprehensive shop;

1. Class record sheet
2. Attendance sheet
3. Individual progress sheet
4. Individual cost record sheet

One sheet should provide a place to record certain items of information about the class; as:

1. Pupil's name
2. Shop numbers
3. School marks
4. Semester
5. Year
6. Number of pupils in class
7. Grade
8. Time of meeting
9. Instructor's name
10. Days that class meets

The attendance sheet should record;

1. Date
2. Class
3. Foreman
4. Pupils
5. Days Present

The individual progress sheet should contain;

1. Name of pupil
2. Semester
3. Year
4. Test scores
5. Projects
6. Pupil's marks
7. Grade in school

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(1)Newkirk and Stoddard: The General Shop p. 90

The individual cost record sheet:

1. Name of pupil
2. Semester
3. Year
4. Quantity and type of material
5. Unit cost
6. Total cost
7. Deposit
8. Debt

One thing must be watched very carefully. In assuming management devices one muct be careful that the devices do not become such loads that they defeat their purpose. One of the most efficient schools that it was ever my fortune to see was so managed that it seemed as though all were working on a time basis at a certain cash rate per hour. The instructor was at liberty at all times to lend a hand where ever it was the most needed. Each student went about his own business. If tools were needed the class foreman secured them and took the check from the individual pupil. There was no overmanagement. It is needless to state that the boys were learning here and were not simply going through the motions for a grade. It was an eight grade in auto mechanics. Each was doing his part. Valves were being ground by several; spring shackels tightened and greased by others; the ignition was being checked by several electrical-unit boys; the roof was being given a coat of waterproofing; two boys from the paint shop were touching up worn spots; the cu-

shions were being upholstered by another group; new floor boards were in the process of manufacture in the wood working unit: and new splash pans were being folded by the sheet metal unit. All were learning the various trades that originally started that car on its way from the factory. It wasn't an old wreck that was being worked on either. It belonged to one of the academic teachers who was paying for the material and the work was real.

Many will argue that this is not the function of the school. No, they would prefer that the boys play on an old worn out auto that never would run. Take it apart, put it together again, and finally wear it out from continual play. That would be education. But for the boys to take a real auto and work on it with the thought that when they have each done their part it will run, that is unfair competition.

The same thing is being done in other units of the general shop every day of the year. Boys bring their old furniture to school to work on. Chairs are refinished and polished, cushions upholstered, and all is not play. It is real and earnest and they take pride in doing the job well. Watch a boy in the average wood shop and see how much interest and pride he takes in that job that has been given him to do to obtain a mark. The whole process in addition to being educational is character

building, and who knows but from this bit of work, master craftsmen will go out into the world, having their start in the comprehensive shop.

There is on foot today a movement to revive the home and fireside industries of the earlier Americans. Why must we wait until the boys grow up, and have to learn all over again. Isn't it better to let them follow their own natural quest for comprehensive knowledge while young? In that way the exploratory function of the junior high school is being fulfilled to its utmost through the general shop.

EQUIPMENT

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When we reach the matter of equipment we run into a proposition that will cause considerable dispute among all shop men. I have looked over lists of equipment with several men and all have stated that either this was unnecessary or that that was needed. What one man deems a necessity, another can see no need of what so ever. Hence I shall try to give as a list of equipment that which all seem to agree on.

When one starts to talk equipment the first major consideration is the cost. The resources of the community are not to be exceeded. It is far better to begin with a small shop and build into that gradually as the needs of the community require, than to overstep and use all the credit available and still have a poorly equipped shop. It is of no credit to anyone, and causes the whole industrial arts movement to lose ground in the town. When the idea is first presented one must have in mind the sum that the community is willing to spend for the first year and then the additional for its upkeep thereafter. Some of the determing factors in the selection of the equipment suitable for the general shop have been listed by Newkirk and Stoddard.(1)

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(1) Nekirk and Stoddard: The General Shop, p 94

1. The aims and content of the course of study
2. The resources of the community
3. The trade units represented in the shop
4. The number of students taking the work at one time.

Suggested equipment for twelve boys:

ELECTRICITY:

4 disected storage batteries
8 disected little giant motors
2 electromagnetic engines
1 starting generator and motor for auto
2 electric toasters
2 electric heaters
2 electric irons
2 electric soldering irons
4 lenk torches #30
2 vacuum cleaners
2 arc welders
8 single pole snap switches
8 single pole flush switches
8 double " snap "
8 " " flush "
8 3 w.s. flush "
8 3 w.s. snap "
8 4 w.s. flush "
8 4 w.s. snap "
8 electroliers "
8 " flush "
8 horse shoe magnets
8 bar magnets
4 wpod braces
1 set of wood drills, increasing by 16ths from ¼"-1"
2 ½" wood chisels
6 ¾" coad chisels
1 breast drill
3 hand drills
1 set of machine drills ½"-1" increasingby 64ths
1 " " " " no. 1 to 60
1 drill chuck
4 file brushes
10 10" flat mill file
5 12" " bastard 2nd cut file
3 8" hack saw frames
6 claw hammers
2 1 lb. ball peen hammers

1 8" side cutting pliers
9 6" " " "
1 10" " " "
1 8"combination gas pliers
2 6" diagonal
2 6" long nose
8 2" rules
1 burring reamer
12 2½" screw drivers
2 4" " "
2 2" ratchet screw drivers
4 pr 10" tinners snips
1 rip saw
1 cross cut saw
6 soldering irons
2 carpenters squares
2 combination squares
1 gasoline torch
4 alcohol torches
1 set Armstrong #2 pipe dies
8 machinist vices
1 pipe wrench 14" and 10"
1 B & S wire gauge
1 bench drill, hand operated
1 center punches
6 6" gas pliers
6 sloyd knives

Furniture for the electrical and Auto Mechanics Department

2 3'x8' floor benches
2 3'x9' " "
144'x6' " "
1 tool crib
1 second hand gear shift chassis
1 second hand gear shift transmission
1 second hand differential

AUTO SHOP:

4 6" screw drivers
4 10" " "
2 12" " "
1 14" " "
1 6" crescent wrench
4 8" " "
2 10" monkey wrench
1 14" monkey wrench

1 set Messberg sq. and hex. socket wrenches
4 sets double open end wrenches, up to ½" nuts
4 1 lbs. machinist hammers
2 ¼", 3/8", and ½"cold chisels
1 inner tube vulcanizing outfit complete
2 cotter pin extracters
12 second hand inner tubes
2 2lb lead hammer
1 2 lb copper hammer
1 set ignition wrenches
1 tire pump
1 tire guage
2 tire irons

WOOD SHOP:

12 smooth planes
" try squares
" 2" Folding rules
" ¼" and ¾" wood chisels
" claw hammers
" mallets
" 8" screw drivers
" combination back and panel saws
" bench brushes
1 wallace portable saw
3 ratchet braces
1 set augur bits
1 expansion bit
2 gimlet bits
1 set steel numbers
3 counter sinks
3 screw driver bits
3 extension dividers
3 marking gauges
1 bevel square
3 8"x12" framing squares
6 10"half round 2nd cut bastard files
6 rat tail files, 8" rasp
12 Sheldon benches
1 Wallace direct motor driven Universal circular saw
1 wire screen tool crib

SHEET METAL:

8 straight tinners snips
6 curved tinners snips
6 rivet sets

2 Pextoe hand punches
6 wooden mallets
6 1 lb. machinists hammers
6 soldering stoves
12 scratch awls
12 ½" soldering coppers
1 complete stake outfit
1 bar folding machine
1 beading machine
1 forming machine
8 machinists vices
6 stone slabs for soldering 1'x1' x 1'
6 fire bricks for soldering
6 pr. 8" dividers
1 36" cir. rule
2 24" " "
12 brass edged rules
1 hollow mandrel

Furniture, benches, and tool crib.
1 Peerless high speed direct motor driven hack saw

PRINTING

10# leads and slugs, size from 4 em to 25 em
12 printers galleys 6¾ x 10½
12 pr hempel quoins
12 fonts of 10 point century school book
1 printers plainers
1 printers belles
20 California job cases with pulls and mortises label holders
1 steel quoin key
1 case brass rule #2042, 2 point etc.
5 Hamilton style floor cabinets 31" x 36"
1 Hamilton wall cabinet no. 2040, in wood
1 small Hamilton ink cabinet
1 Hamilton iron surface imposing stone no. 3960, in wood
1 Chandler and Price 26" lever paper cutter
1 Chandler and Price New series 10 x 15 job

MACHINE SHOP:
1 bench grinder with direct electric drive
1 bench drill press with direct electric drive
1 bench precision lathe " " "
8 1 lb ball peen hammers
8 center punches
8 scratch awls
8 pr. dividers

6 6" steel scales
3 combination squares with 12" scales
3 pr outside calipers 6"
3 pr inside calipers 6"
1 pr each 1"-7-2" Slocum micrometers
6 ¾" cold chisels
12 10" single cut bastard files
12 10" single cut mill files
3 6" screw drivers
1 10" " "
1 6" monkey wrench
1 set drills no. 1 to 60
1 set drills 1/8" to 5/16 by 64ths
1 set dies ¼" to ¾" standards
1 set machine screw dies standard
3 each standard U.S.S. taps, ¼", 5/16", 3/8", 7/16"
1 pr 6" gas pliers
1 set open end wrenches, up to ½" nut
6 8" rat tail files
6 8" sq. ¼" "
9 machinists vices with 4" jaws

GLAZING:

12 putty knifes
2 lb glazier points
12 glass cutters (ruby or red devil)
6 yard sticks
putty (or manufacture from lead, whiting, and oil)

CONCRETE WORK:

3 Spading tools
2 Edgers
2 Grovers
3 steel finishing trowels
6 cement workes trowels
1 wooden float (made in shop)
Bins for storing sand, cement, etc.
Measuring boxes ¼ cu. ft., ½ cu. ft., 1 cu. ft.

Any of the preceding lists of equipment may be added to as the community interests require. There will be some that will start with a small shop, then the material that is to be secured can be cut to fit the situation.

It has been found that if the people of the town find that certain things are needed many will be very glad to contribute to the establishment of the general shop. The material for the auto shop can be secured from any of the local garages for no cost whatever. It is necessary to purchase tools if there is to be any uniformity of equipment, and if the shop is to be of real use. An enterprising school can set up some of its shops on the unit basis of the comprehensive shop for a small group at a very reasonable figure. All that is then necessary is to add to it as it goes along and expands gradually, keeping in mind the needs of the community and the objectives of the shop program and the functions of the junior high school.

TESTING & MEASURING

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The next thing that always worries some teachers, is the matter of testing the material that they have been attempting to teach to their pupils. This is done in the academic fields by the various methods of testing. Oral questions, and answers, written examinations, reports, etc. It is felt that there must be some way objectively of testing the material of the shop as well. Earlier in this section I gave an example of one type of an objective test as applied to one of the units of a job.

Tests in the field of the general shop have the same objective as do the tests of the academic field. The old type of examination test was a very thorough type of test, and its departure is to be regretted, but it was difficult to correct, and very often unfair to the pupil. The new standardized tests have the same objectives in mind but are far more easily administered; more questions can be given, thus giving a wider range to test, and incidentally, they are far easier to correct. Indeed it is not uncommon to allow the students to do their own correcting. There is a certain character value even to that simple function. In the general shop the chief relience for some time will be on informal classroom tests, inasmuch

as suitable standardized tests covering the various aspects of the work are not yet available.

Ruch in his book the "Improvement of the Written Examination" sets up six principles that are to be followed in the making up of local examinations:(1)

1. Reliability-the consistency with which a test measures whatever it does measure.
2. Validity-the extent to which a test measures what it purports to measure.
3. Objectivity-freedom from the personal bias of the scorer.
4. Flexibility of Form-different types of questions suitable to different teaching situations (as opposed to the old essay type of question which disguised a single approach under such verbal variations as: "What is," "Name," "Illustrate," "List," "Evalaate."
5. Ease of scoring-accuracy, objectivity and speed are factors here.
6. Economy-conservation of teacher's time for the formulation of good questions; delegation of routine scoring to clerical workers.

A class room test is only valid when it taps enough sources to give an accurate sampling of what the course content has been. No other test is valid, and no pupil should be marked on a test that tests only specific knowledge that the teacher is interested in personally. It is important that the questions be only those of the most importance; that a large number of questions covering a large portion of the work be asked; that all questions be asked with the relative and social utility of the subject matter in mind: that other persons be asked and conferred

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(1)Ruch, G.M., and Stoddard, G.D. Tests and Measurements in High School Instruction. Chap. 11 and 111

with on the importance of the questions; and that the examination shall not cover material that is outside the course.

Reliability can be secured only if there is a large number of questions; if the questions are objective in nature or type, and one point of utmost importance is the subject matter. Questions that are so easy to answer, that they are dead weight are to be avoided as are those that can not be answered by any one pupil. The matter should fall between eighty and twenty persent of possible answers. This can be determined by short tests that can be given at interval between the examinations. Conditions are to be the same for the administration of the tests to all groups. In revising the tests, attempt to cut out those questions that fail to discriminate between the poor pupils and the good pupils. This can be done in a great many cases by deleting those questions that have been answered correctly by both the poor and the good.

By the term objectivity is meant the type of test that is given. If the personal bias is completely excluded, then the test has high objectivity. Such tests as are the completion test, the multiple choice test, the matching test, and the true and false test. These is some disfavor shown for the latter form of test. Some claim that it allows too much opportunity to guess. If such has been

the case, it is not the fault of the test, but the fault of the maker of the test in either the wording of his question, or the choice of his subject matter. Another type of question that can be used for the general shop program is the procedure arrangement test. This matter of procedure was discussed at some length earlier in this paper. Briefly it is the process of placing in the correct order a group of terms that are performed in the making or performing of a certain article. For example, to set a pane of glass. In the doing of this job there are certain steps that are taken in a proper order. The arrangment of these steps constitutes the procedure arrangement test. Another form is to have a diagram given on the sheet and instruct the pupil to perform a job. To do this job it is necessary that he first draw in the missing connections, orllines that will make the diagram correct and complete. Then the procedure arrangement test follows, so that this type may often be a two part test.

In correcting the tests there are a number of different methods. Usually most teachers will prefer to work out their own method and scale of evaluations. For the multiple response, best answer, true,-false, and matching type it is well to correct for chance. This is done through the utilization of the formula:

$$\text{Corrected Score} = \text{Rights} - \frac{\text{Wrongs}}{n-1}$$

In this "n" is the number of opinions in the item. In testing it is sometimes wise to correlate the results of the testswwith the mental ability of the student. This can be determined by intelligence tests that have previously been given to the pupil. The teacher's estimate of excellence can be gauged between the classroom test and the standardized test. Another waysof testing the test and its results is to split a test into two chance halves and present half at stated intervals. If the pupil has the material as he should have it, it is probable that he will make somewhere near the same score on each. The method of correlating this in the manner previously spoken of is as follows:(1)

a. Split the test into two halves as indicated.
b. Get the total score on each half.
c. For the entire group (not less than fifty pupils) compute the correlation between the two forms. This figure is a quantitive representation of the reliability of one-half of the test.
d. Determine the reliability of the whole test by substituting N equals 2 in the Spearman-Brown Prophecy Formula. The coeffieient of correlation thus obtained indicates the reliability of the test.

The follwing are tests that have been investigated and recommended for the general shop by Newkirk and Stoddard in the "General Shop," a text published by the Manual Arts Press, Peoria, Illinois. Many instructors

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(1) Newkirk and Stoddard. The General Shop. p. 160

will find that they can, after using these tests, make out their own that will prove just as satisfactory for their own particular class, and which may better meet the needs and type of training for their school.

Shop Tests, bt William L. Hunter. (1) Sixteen tests are available in Series No. 2. (1928), as follows: Published by the Manual Arts Press of Peoria, Illinois.

1. W-9. Board Measure test for woodworking. 25 items involving cost computations; 18 minutes working time.

2. W-10. Multiple choice test for wood and lumber. 25 informational items of the 3 response type; 6 minutes.

3. W-11. Reading test for a framing square. 25 items covering various pitches, runs, and kinds of rafters 20 minutes.

4. W-12. Objective test for wood finishing. 11 completion and 14 two response informational items. 7 minutes.

5. W-13. Multiple choice test for carpentry. 25 informational items: 3 response type; 8 minutes.

6. W-14. Multiple choice test for pattern makers. 25-3 response in informational items; 6 minutes.

7. MD-3. Lettering test for mechanical drawing. Duplication of all upper case and lower case letters and numerals both vertical and slant. Time allowance with pencil, 15 minutes: with pen and ink, 30 minutes.

8. MD-4. True false test for mechanical drawing. 25-2 response items covering elementary knowledge; 5 minutes.

9. MS-5. Multiple choice test for machine shop. 25-3 response items on points covering information. 6 minutes.

10. E-2. Objective test for electricity. 11 completion and 14-2 response items covering general information: 6 minutes.

11. AM-2. Multiple choice test for auto mechanics. 25-2 response items dealing primarily with the engine; 6 minutes

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(1) Newkirk and Stoddard The General Shop. p.163

12. P-1. Completion test for printing. 25 completion itmes covering kinds of type and general information; 10 minutes.

13. G-1. Related test in shop English. 50-2 response items on elementary grammar. 5 minutes.

14. G-2 Related test in shop methematics. 25 mensuration problems based on drawings. 15 minutes.

15. G-3. Related test for shop arithmetic. 25-3 response arithmetical problems; 15 minutes.

16. G-4. Related test for geometry, 25 completion items based on geometrical figures, 8 minutes.

A mechanical drawing test by Drew W. Castle has five parts in this test booklet.(1)

1. Interpretation of drawing of objects by their features. The test provides for 28 items and has a working allowance of 3-½ minutes.

2. Use of arithmetic in mechanical drawing demensional situations. Six items based on four drawing; 4 minutes working time.

3. Use of geometrical terms. 10-4 response items and 4 completion statements. 1-½ minutes.

4. Ink drawing technique. The inking in of a lightly printed diagram. 20 minutes working time; subjective rating of results.

5. Pencil drawing technique. Pencil reproduction of a simple drawing, with slant lettering; 12 minutes. The scoring is somewhat subjective.

The Nash-Van Duzee Industrial Arts Tests for Junior and Senior Hish Schools (2) has four sections.

Part One	covers woodwork, 60 true-false questions on general information and 42-3 response on knowledge of tools andmaterials.
Part Two	covers wood construction. Show different kinds of joints. Pupil marks drawings

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(1) Published by Drew W. Castle. Joliet, Illinois
(2) Published by Bruce Publishing Company, Milwaukee, Wis.

correct or incorrect and in the latter case makes the correction or supplies the missing part.

Part Three Reading a Drawing presents three drawings of a mortised lock with completion statements calling for a correct interpretation.

Part Four Tools and Processes, procedure type questions on squaring a board, filing a saw, etc.

Patrick's Industrial Arts Test.(1) Designed for measuring diversified activites. (Woodwork, Concrete, Electricity, and others). Consists of 100-4 response items covering the knowledge of these fields.

The Newkirk and Stoddard Home Mechanics Test.(2) To test the material that the pupil should get from a course in home mechanics. Available in two forms, each consisting of 36 questions of the procedure type.

The use of what are called aptitude tests is advisable in order to determine the special bent of the student. It is known that some individuals are more capable in some types of activity than in others and that special measures have been devised that predict with greater accuracy than the general intelligence-test scores the achievement in the different types of activities.

Some of the tests that are used to determine these aptitudes are more or less familiar to all men of the new junior high school. The first tests were published

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(1)Published by the Public School Publishing Company Bloomington, Illinois

(2) Published by the Bureau of Education Research and Service, University of Iowa. Iowa City. Iowa

in 1918 and were devised by J. L. Stenquist. Since then many have been published that are widely used by guidance counsellors in the public schools, clubs, factories, etc. The correlation between mechanical aptitude tests and the criteria for success ranks high. This is shown in the table on the following page.

Cooefficients of Correlation between Mechanical Ability Tests and Criteria for Success for 100 Seventh Grade and Eighth Grade Boys (1)

Test		Criterion		
	Reliability of the test	Quality	Information	Quality and Information
Packing blocks	.77	.26	-.04	.13
Card Sorting	.90	.19	.00	.11
Minnesota Spatial Relations, Boards A B D D	.84	.53	.40	.55
Paper Board Series A and B	.90	.52	.57	.65
Stenquist Picture 1	.89	.24	.35	.35
Stenquist Picture 11	.90	.31	.34	.39
Minnesota Assembly Boxes A, B, C	.94	.55	.35	.53
Otis Intelligence Quotient		.21	.67	.52
Academic Grades		.42	.54	.57
Son's Mechanical Operations		.30	.35	.39
Interest Analysis Blank		.55	.39	.56

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(1) Koos and Kefauver. Guidance in Secondary Schools pg. 313

A COURSE FOR THE GENERAL
SHOP

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One factor that the writer has noticed in his reading is that most of the shops planned are for the average number of boys (500). The admission has been made by some administrators that up to and including that number of pupils the general shop functions as it should. When the numbers grow larger as is the case in the larger city schools then the specialized shop is more economical and efficient. To prove this point would be a rather difficult matter. It is not my intention to do this. It is my intention to prove that through the general shop guidance functions and the development of character through a sustained program can be done more efficiently and with better results than by the other method of shop practice.

In setting up the curriculum for the general shop, it must be kept in mind that he general shop is only one of the phases of the whole pupil-program. It is not only in the general shop that the character education and guidance activities should function, but in all classes of the entire school. The statement has been made that the chief duty of the American school system is the educating of its youth for citizenship; even for an intelligent

citizenship, one that is cooperative, one in which each does well that thing that he can do the best.

The general shop has an important part to play in this educative process. Here the members are doing that thing well in which they are interested. There is no lack of interest. There is no laziness; cooperation is present; each has a pride in doing the best that he can. It is an attempt to make the conditions in school as near like those that are met in life. By that we do not mean to copy the bad features that adults use in their life. Neither do we mean to set up a Utopia. But we must, as Hartshorne states, return to an apprenticeship condition. We must identify all our teachings of character with life activities. It should not be taught as a thing apart, a separate subject, a period set apart each week in which the instructor states, "Now we are going to have character education." It must be as natural as is humanly possible. It should permeate all of the activities carried by the school and all classes in the school. It should carry on whenever it is needed, and the proof of the program will be felt when the pupils secure that feeling of satisfaction at the result. Their reactions to situations in the classes are immediate. With these aims in mind the administrator makes out his curriculum.

The junior high school has exploration as one of its major aims or objectives. So has the general shop. Its chief objective is one of exploration under the most natural conditions, that of interest and participation.

One of the first matters that must be considered is the matter of units to be taught in the comprehensive shop. Is it the desire of the community to present as many different types of exploration as possible, or is it the aim of the community to present only those that are in the fields open to inhabitants of the locality? Or shall we in our selection have in mind those subjects that will have the greatest training value to the student? Then that will cause the question "What ones are the most value to the student? Who shall decide? Is he to decide; the schoolmaster, the home, or the school board?" One method of decision that was used in one community was of sending letters to a large number of the leading men of the community asking them to enumerate those skills that they found to be the most useful in their homes, offices, etc. On of the basis of these skills that were selected the subjects were selected. The prime purpose being to train the boy to be of use in his home, both to himself, his family, and his community.

These are of sufficient interest and bearing in the matter of selecting a course of study for the general shop

as to make it worth while to report them.(1)

GENERAL:

1. Replace broken glass in a wondow or door.
2. Splice rope and tie common knots.
3. Nail on sole and rubber heel.
4. Repair garden hose.
5. Fire heating plants.
6. Repairs a plastered wall.

ELECTRICAL.

1. Detect and replace a blown fuse.
2. Assemble or repair an attachment cord.
3. Hook up doorbells and buzzers.
4. Wire an extension cord for a lamp.
5. Read the electric meter.
6. Give first aid to one who has received severe electric shock.
7. Make N.E.C. Splice
8. Install a raido set.
9. Simple house wireing, 110 volts, AC.

DRAWING:

1. Read working drawings
2. Make a sketch.
3. Simple lettering.

WOODWORK:

1. Use simple tools in squaring stock to dimensions.
2. Make a window screen.
3. Use glue for general repair.
4. Strenghten a weak joint.
5. Select and use nails and screws.
6. Set hinges.
7. Use different types of bits and drills.
8. Study lumber and the different kinds of wood.

FINISHING:

1. Apply paint to new or old sufface.
2. Apply stain, filler, and varnish on new wood.
3. Refinish furniture and woodwork.

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(1) Newkirk and Stoddard. The General Shop. p.27

METAL WORK:

1. Sharpen knives.
2. Repair cooking utensils.
3. Replace the spring in a mortice lock.
4. Whet a plane or chisel.
5. Shape the point of a screwdriver.
6. Clean and tin a soldering iron.
7. Use taps and dies.
8. File a key.
9. Adjust and set rip saws and cross cut saws.
10. File and set rip saws and cross cut saws.
11. Use solder in repair work.

PLUMBING:

1. Repair a leaking compression faucet.
2. Repair a fuller ball faucet.
3. Repair a leaking flush tank.
4. Clean a drain trap.
5. Cut and thread a piece of pipe.

AUTO MECHANICS:

1. Drain crankcase and fill with new oil.
2. Remove carbon and grind valves.
3. Fit a new set of piston rings.
4. Overhaul the cooling system.
5. Check fuel system and adjust carburetor.
6. Wire ignition system and test spark plugs.
7. Test and care for storage battery.
8. Clean the commutator on generator and motor.
9. Wire a car for headlights, dash lights, and tail lights.
10. Adjust steering gear.
11. Rebush front axle and test forcaster and camber.
12. Clean and adjust the front wheel bearings.
13. Repair leak in inner tube and assemble tire.
14. Overhaul and lubricate a rear axle.
15. Adjust and clean the clutch.
16. Adjust and reline emergency and service brakes.
17. Take up connecting rod bearings.
18. Take up main bearings.
19. Pitch top and curtains, or recover top.

CONCRETE:

1. Cast a small article from concrete.

2. Construct a sidewalk, cement floor, or feeding platform.
3. Put reenforcement in concrete.
4. Drill holes in masonary with star drill.

When we look through this list we find that it contains many of the handy man variety type of projects and has been broadened to include those connected with the auto shop. The auto shop is a very desirable feature of the general shop. Nearly everyone has a car and all wish to become familiar with it. The justification of teaching these varied things or skills in the schools is well stated by T. J. Kirby. (1)

> "One of the modern trends guiding the preparation of instructional units for our schools is to have these units approximate life's realities as nearly as possible. In no field should this principle yield more fruitful results than in practical arts.
>
> The boy or girl today does not have the opportunity to do these mechanical jobs about the home through participating in them with their parents that was afforded young people when most of our adults were young. Then, too, many of these problems are more complex than those that confronted the members of the home a quarter of a century ago.
>
> For these reasons it has become more necessary for the school to give a course of training to prepare young people to perform these jobs which are going to confront them. It seems reasonably certain that they will be called upon to do the, and the school should assume the responsibility of making them able to do better those things which they are going to do anyhow."

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(1) Newkirk L.V., Course of Study in Practical Mechanics. University of Iowa Extension Bulletin, No. 164 April 15, 1926, pg 9-10

> But these young people are not only going to be doers in this field of mechanics arts, they are also going to be consumers or users of the products of this great field of activity. Effort has been made in the course to provide through doing these jobs and through other lessons especially designed for the purpose, knowledge and appreciations that will enable these young people to make the daily decisions when purchasing and when employing the service of others in a better way than they would do without this guidance."

Then in the curriculum there should be room for the boy to specialize for a particluar field that he must enter due to economic conditions as soon as he finishes the junior high school, or for the boy who is to enter a trade school with the aim of a learned trade in view.

Let us briefly review some of the subjects that can be taught in the shop and see if they can be justified. If the matter is of later value to the student in his own home or community that is one means of justification. If it leads him to become interested in an allied line of endeavor then it belongs. If he learns certain skills that are of value to him no matter in what field he later enters, then he should have the chance to explore it under guidance.

Auto Mechanics due to its common use among the people of the community justified itself without too much difficulty. The electricity that he as a boy learns in this

trade may be of inestimable value to him many times later. The theory of compression engines that is embodied in the motor, is practical science for the boy. He is without exception interested and wishes to do a good job. The chances are nine in ten that he will practice his school knowledge on the family car. The low cost of equipment for the auto shop is another feature in its favor. The number of different activities that are involved in the repair of the car makes its teaching value more evident.

Woodworking is one of the bases of the entire mechanics arts work. There are few operations where some of the skills that are learned in wood working are not applicable. Its utility at home, in the camp, in the community is great. For instance, if boys are allowed to do those things that they wish, provided that they have the skill to do so, we need no further proof than to go into those shops where this is the objective and see the number of varying devices that are in the process of manufacture.

Electrical units have always exerted a strong influence on the growing boy. He wants to tinker with things that are electrical; bells, buzzers, transormers, the making of a radio set, a transmitter, etc. Then there are jobs with out number that he can do at home. The fixing of that light for his own room, cords for extension lights, electric irons and toasters for mother. Where can he bet-

ter learn these things than in school under competent instructors.? Equipment is not expensive, and is of small value if he desires to manufacture something in class.

Drawing and woodwork usually go together. This is a feature that is essential for all to know. Its utility is unmeasurable, but its value is inestimable. The cost again for equipment is not great. Here we meet a difficulty; all cannot draw equally well. But all can learn to read correctly a drawing that has been made by another. Interest here is a matter of teaching ability, and arrangement of course material.

Sheetmetal and plumbing are usually taught together. The sheetmetal is not of so much home or community value as the plumbing. Here small jobs in the home are again of value. The "Mr. Fixit" of the house gets considerable pride from the fact that his mother tells all that he reparied a faucet that has been dripping for a long time. Equipment here is more expensive than in the other shops mentioned but still not ~~out~~ unattainable. It can be justified in the abilities that the boy acquires that are transferable.

Printing is one of the subjects that is taught in the Junior High School which will bear considerable effort to justify. In the first place the cost of equipment if rather high as compared with the cost of the other shops.

If the purpose of the school were to fit for life then there would be an ample reason for inclusion. Since the purpose is not preparation for life but for exploration in varied fields then we must seek other reasons to justify it. There is always the strong reason advanced by many administrators that it provides for many forms and blanks that otherwise could not be printed as the school board would never sanction the cost of many of these items. But since there is a print shop included in the school, the only cost is the teacher's time and the cost of the stock plus the operation of the machines. That is not a legitimate excuse or justification. The spelling and mathematics that are acquired are of small value, and could be acquired elsewhere with less cost. For the average sized junior high school then the writer would not advise the inclusion of a print shop as one of the units of the comprehensive shop.

It has been advised by many writers that the ideal situation in the comprehensive is to have sufficient space to provide for the inclusion of all the units in one room, with two teachers as directers of the activities.

However, it is not always possible to house all the units in one room. This may be so when a new school is being built and the plans for this may be included

in the building plans. Manyschools are already built and the adminsstrator has to take what he has and do the best he can with the situation. Under the plans of floor layout I have included a sufficient number of layouts to give an idea of the type of shop plan that can be worked out under various conditions.

The grouping of subjects is another that causes considerable discussion. The Scranton Plan announced the method of groupings into three groups as given on page 65. This was deemed advisable in thir case. The plan of grouping is to have machine shop, plumbing, and sheetmetal in one group, and auto mechanics and electricity in another, while the unrelated subjects, woodwork and printing were left for the third. This grouping has beed used by others as well. It seems to be about the best that has been devised.

Bobbitt in his book "How to make a Curriculum," lists ten objectives in education as follows:(1)

1. Social Intercommunication
2. Maintainance of Physical efficiency.
3. Efficient sitizenship.
4. General social contacts and relationships.
5. Leisure occupations.
6. General mental efficiency.
7. Religious attitudes and activites.
8. Parental responsibilities.
9. Unspecialized practical activites.
10. Occupational activites.

Under the last two headings come the activities of the general shop, although the activites are important through-

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(1) Bobbitt, F. How to Make a Curriculum, 1924 pp 11-29

out the curriculum. The emphasis may be shifted from grade to grade as the interests of the child change and as his ability become more marked.

Both Charters and Bobbitt in their books do not make such provision for the growth of the curriculum. The analyzed curriculum that is advocated by Charters and Bobbitt certainly has its part if the object is teaching specialized activities, but when the objective is not that, the curriculum there is weak and calls for some safeguards. Bode(1) says:

> "The significance of the democratic movement lies in the notion that training for specific objectives can not be the whole aim of education, for the reason that the purpose of this movement is precisely to make over the social order and present modes of living so that we may progressively substitute new objectives for old ones. Any scheme of education that fails to make provision for this element of progress is, so far forth, hostile forthe democratic purpose of humanizing both education and life---"
>
> "The method of activity analysis must be directed by a theory of what education should seek to achieve, and not be regarded as a substitute for such theory. Activity analysis does not determine objectives, but our objectives determine what sort of facts are needed, and consequently how the method is to be used."

The analyzed method advocated by Charters is excellent when it is to be used for the specialized ends; that is the tool subjects in vocational work, andiit applies theoretically when the ends become complex. There is littleattention paid to the principle of emergence--to an in-

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(1) Bode, Boyd H. Modern Educational Theories. 1927 pp79,112

tegration of experience at a higher level, a process dedending not upon the completeness of an educational structure, but upon the meangs, purposes, attitudes, and ideals.

The true junior high school is more than a grouping of the 7th, 8th, and 9th grades. It has certain functions which are specialized although they fit into the work of the lower grades and those above. Douglas (1) states that they have an adjustment which will better enable the school to achieve accepted ends. This is not as clear as those that have been reported by Koos in a composite table in the junior high school.(2)

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(1) Douglass, A.A. Secondary Education. 1927 p. 36
(2) Koos, L V The Junior High School. 1927 p. 17

FREQUENCY OF APPEARANCE OF PECULIAR FUNCTIONS PROPOSED IN EDUCATIONAL LITERATURE FOR THE JUNIOR HIGH SCHOOL

Peculiar Functions of the Junior High School	In Statements in School Documents		In Statements by Educational Leaders	
	Number	Per cent	Number	Per cent
I. Realizing a democratic school system through				
A. Retention of pupils	22	73.3	18	90.0
B. Economy of time	19	63.3	17	85.0
C. Recognition of individual differences	16	53.3	19	95.0
D. Exploration and guidance	12	40.0	15	75.0
E. Beginnings of Vocational education	12	40.0	14	70.0
II. Recognizing the nature of the child at adolescence	11	36.7	11	55.0
III. Providing the conditions for better teaching	14	46.7	17	85.0
IV. Securing better scholarship	6	20.0	7	35.0
V. Improving the disciplinary situation and socializing opportunities	14	46.7	14	70.0
VI. Effecting financial economy	6	20.0	2	10.0
VII. Relieving the building situation	6	20.0	1	5.0
VIII. Continuing the influence of the home	2	6.7	-	---

1X. Hastening reforms in the grades above and below	1	3.3	2	10.0
X. Normalizing the size of classes	-	---	2	10.0

It will be noted that meeting the needs of the pupils (individual) proves the least wasteful of school and community funds regardless of the new demands of organisation and special equipment. There is a close connection between the junior high school functions and the aims and objectives that have been discussed. It is during the ages served by the junior high school that the ideal and the practical fit into the scheme of things nicely. It has bebeen able to change the routinized learning which stamped the drab period of the old grades seven, eight, and nine.

At first it was inevitable that there should be considerable blundering on the part of the junior high school, but gradually types developed and day by day appropriate activites were instituted which opened up new views to the adolscent boy and girl. One of these was the work in industrial arts and today there is scarely a school that does not include the arts in its curriculum. It is one of the core subjects in most schools, running through the three years. Bobbitt makes out a very good case for the industrial arts to be of the comprehensive orgeneral shop type;(1)

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(1) Bobbitt, F. How to Make a Curriculum. 1924 pp28, 29, 180 ff.

> "Ability to use all common kinds of measuring devices; measures of lenght, area, volume, capacity, weight, time, value, temperature, specific gravity, etc: ability to sharpen, adjust, clean, lubricate, replace worn or broken parts, and otherwise keep household and garden tools and appliances in good order and working condition: ability to make repairs, adjustments, and additions to the house and its equipment: ability to make repairs, adjustments, and sometimes to construct household furniture of other equipment: ability to particupate intelligently in the original planning of one's home; ability to keep the house in good order; ability to operate household equipment; ability to keep the house, premises, and equipment clean and sanitary; ability to care for and operate the electrical system and appliances, or replacements, ability to perform the operations, involved in the care of the premises and garden."

Bobbitt even goes so far as to state that these abilities make for family solidarity in addition to the saving of social waste. It tends to make a better citizen for his community if he has the abilities that he states. This is one more step in character.

Douglass (1) thinks highly of the general shop as a means of teaching knowledge of tools, materials, and elementary shop practices which apply most directly to the affairs of life. It is a place for testing abilities and interests.

> "The work is organized, not on the basis of wood, metal, or electricity, but as a series of projects of increasing complexity. A project may combine sawing or planning with electrical wiring and elementary metalwork. The educational theory behind the general shop is excellent. It seems to be the most feasable solution of the mamual arts pro-

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(1) Douglass, A A Secondary Education 1927 pp 572-573

> blem in the small school; it may supplant the special shops in the large school."

He believes it a fine think for the small school, and possibly for the large school. If it is educationally the sound thing for the small schoo, why is not the same thing sound for the large school? Students learn in the same manner in the larger schools as they do in the smaller school. Today I feel that possible Douglass would state that they are sound for all schools of the seventh, eighth and ninth grade years.

Industrial arts specialists also seem to be in close agreement with the writers in the general educational field. Snedden and Warner (1) state that the primary aim of the industrial arts in the junior high school is "developmental experience through manipulative and other activities introductory to the various accessible phases of the worlds industrial work; " and as secondary aims, the activities implied in exploration, guidance, consumers knowledge and appreciation, household mechanics, hobbies, vocational preparation, correlation with other studies and social habits. In the last item is one of the opeinings for the character development through the general shop.

To sum the curriculum up it will be well to uee the words of Newkirk and Stoddard (2) who state that;

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(1) Snedden, David, and Warner, W. E. Reconstruction of the industrial arts courses, Teachers College Columbia Univ. N.Y. 1927 p 10

(2) Newkirk and Stoddard The General Shop

> "The general shop is in accord with sound (or at least current) educational theories; it is an integral part of the junior high school program (particularly in small schools); and its contents may be reasonably well determined in advance of common teaching practice by the technic of curriculum construction utilized with other subjects."

CHARACTER EDUCATION AND GUIDANCE IN THE GENERAL SHOP

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In the past few years has come the realization that the school or the home is falling down in one important item. That is the building of character. It has been the subject of much talk and speculation, and numerous books and articles have been written concerning it. "The Teaching of Ideals," by Charters, is one of the many attempts to show the way; also Harchorne's, "Character in Human Relations." The Department of Superintendence, Tenth Yearbook is devoted to a study of Character Education. Schools, churches, homes, society, and the courts are all working for the same end; to develop character, and to make the individual a useful member of society.

What is Character then? Holmes states that Character is the "total customary reaction of an individual to his environment. "Hartshorn and May say that "the chief mark of character in a man is the ascendency of ideals over circumstance." Personality and character are closely allied. Personality is what a person is in the total aspect of his ideals. The main difference is in its subjectivity. Kilpatrick states that there are three elements to character: (1)

1. A Sensitivity of what may be involved in a situation
2. A Moral deliberation to decide what should be done.
3. The doing or affecting of the decision so made.

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(1) Kilpatrick, W H Foundations of Method pg 337

There are very few, if any, individuals who have a 0% character; they range all the way from that to the 100% of which no one can boast. Wherever the human element is to be considered-a sliding scale of evaluation must be used.

Hortshorn and May claim that there are three phases to the development of character; Intellectual, Dynamic, and Performance. Bower says that (1)

> "Underlying all other incentives, persons are impelled to action by the impulses of original nature.--Persons are also impelled to act in practical situations from social pressure of various sorts.--In a more advanced stage social presure become conscious and intential.--Mores which were mere customs, now become morals.--In less formal relationships, especially in the school, rewards and punishments are used as incentives to desirable conduct.--Closely allied with rewards and punishment as incentives is competition. This, too, roots back in the native tendency toward rivalry and the satisfaction which success brings, as well as in the desire for recognition.--In a world set up as our world is, in order that certain desired ends may be attained, certain other things MUST be done.--The highest incentive upon which persons act is a sense of the intrinsic worth in the enterprise itself."
> It is from this last that we get our whole scale of values.

But why state all these? Is it necessary to know all this in the general shop? It is certainly very important for there every day, every minute, the pupil's characters are being developed. If the opportunities are lost they do not return again. How then shall the school create the most wholesome environment for the pupils during his

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(1) Bower, William C. Character through Creative Experience. pg 210-214

time at school? The Industrial arts teacher has a better chance than the academic instructor becuase of a close personal relationship in cooperative work. It has often been said that the coach of an athletic team has more influence over the boys for good or ill than does the principal of the school, and for exactly the same reason. The Mechanics Arts teacher has a fine opportunity to exert a a very great influence on the pupils.asI have pointed out earlier in the thesis.

In the whole cooperative process there is an approach toward the method of apprenticeship that is advocated by Hartshorne. He claims that it is the doing away with this apprenticeship by the industrial revolution that has lost for us one of the strong features in the building of character. The mere doing of a thing does not necessarily make for character; but rather the development of purposes, attitudes, and skills in the companionship and under the guidance of one of fine personality and character.

Earlier in this paper I quoted from the study made by Chandler Hunt on the results of Character Education in commercial positions. A similar study was mentioned at that point concerning a study made by John M. Brewer of the Bureau of Vocational Guidance of Harvard University, as the matter of character related to industry:

Incompetency	25.3	
Slowness	4.6	
Physical unadaptability	3.9	
Spoiling Work	.4	
	34.2	Lack of skill or technical knowledge
Insubordination	11.1	
General unreliability	10.4	
Absenteeism	10.1	
Laziness	7.2	
Trouble making	4.1	
Drink	4.1	
Violation of rules	3.2	
Carelessness	2.7	
Fighting	2.4	
Misconduct	2.3	
Dishonesty	2.1	
Loafing or Sleeping	1.8	
Dissatisfied	.5	
Habitual laziness	.4	
	62.4	Lack of job wisdom Character traits
Miscellaneous	3.4	
	100.0%	Total of reasons for discharge

This study is interesting in that it shows that the persons who are discharged are not discharged for lack of technical skill, but for the lack of character. This is the same conclusion that Chandler Hunt came to in his survey.

The important thing, then, if we are training for life, is to handle these boys if possible so that they will be able to develop those purposes and attitudes that will enable them to hold their positions in industrial, commercial, or professional life. The pupil in the junior high school is at an impressionable age and the program should

be such as to develop the character which will insure greatest usefulness in life.

How then can this be applied to the general shop or the comprehensive shop of the junior high school? Since the writer advocated the teaching of projects, it is through this method that character education and guidance is made possible. It provides the finest kinds of situations for character building.

In the general shop there is a grouping of units, The type of units that are grouped depend upon the local situation. The units selected will not affect the teaching of character or lessen the effectiveness of the guidance functions of the teacher.

The instructors assigned to each of these general shop-class-rooms at the opening of the school year should refrain from setting up too many rules. The class should consider them counselors and guides, and not disciplinarians. This can be accomplished by their own attitude toward the work. If they look at it merely as a job with a course of study to follow slavishly, then character development is jeopardized. If they lose their temper, are careless in their own habits, lax in fulfilling promises, it is not long before the students "catch" the same habits. If they are indifferent in their supervision, then the students' work shows indifference, and the projects that are turned

out in that class show no high degree of workmanship. Character is in part good workmanship.

Taking the character traits as listed by Dr. Brewer and comparing them with the character traits as listed by Chandler Hunt we will secure a picture of those traits that are common in the loss of positions both in Industry and in the commercial pursuits.

INDUSTRY:	COMMERCIAL FIELDS:
Insubordination	Carelessness
General Unreliability	Non-cooperation
Absenteeism	Laziness
Laziness	Absence for causes other than illness
Trouble making	Dishonesty
Drink	Attention to outside things
Violation of rules	Lack of initiative
Carelessness	Lack of ambition
Fighting	Tardiness
Misconduct	Lack of loyalty
Dishonesty	Lack of courtesy
Loafing or sleeping	Insufficient care of and improper clothing
Dissatisfaction	Self satisfaction
Habitual laziness	Irresponsibility
	Unadaptability
	Absence due to illness

In an examination of these two columns with no regard to the percentages that are given in the tables we find that there are some items that are common to all fields of life: carelessness, laziness, dishonesty, and absence.

These four occur in exactly the same terms in each list. Then there are others that are similar in idea, for example: General unreliability and Irresponsibility, vio-

lation of rules and non-cooperation, fighting and lack of courtesy.

Those other terms that occur may be due to the differences in the occupations.

Since the purpose of the junior high school is for exploration as I have stated many times before, then our policy is not only to train these young persons for a place in industry, which many shop teachers seem to think is the sole job, but to fit them for life in any of its many and varied pursuits. The things that we can endeaver to do for each individual as to train him to keep his head, to cooperate, to be reliable, to obey rules, not becuase they are rules, but because they are for the good of the majority of the class; to work carefully and accurately; to be strictly honest; even though he personally may suffer by his honesty; to be dilligent; to be regular in attendance; to mind his own business; (not non-cooperate, however), but to avoid causing trouble for someone else by his actions; to develop the power to take care of his own conduct, and to make himself personally presonsible for the conduct of his neighbor as well; to keep busy on the job, and when failing to have work on hand, being resourceful enough to find something that will keep him occupied so that he will not interfere with others who are busy. It seems like a tall order but it can be done. The general shop is as

nearly like a natural situation as the school can create. It enables the boy to follow his natural bents within the limits of his own abilities, and lacking some natural tendencies to develop them.

Under the management devices that were listed for the general shop are many that have possibilities for character building, and which have guidance values. Let us take that of the care of the supply room. Here the boy is given responsibility for all the tools there. He feels the personal responsibility. If there is the proper attitude in the class, that has been developed gradually by the instructor, each boy has a bit of responsibility in this other boys' position. They realize that they will soon have the same position, and hence are loyal to the boy in seeing to it that there are no misappropiations of tools and supplies, which have been charged to them. The "gang spirit" is very often in evidence here. If it is directed in the proper way it is a very helpful factor. Honesty is another trait that can be developed. A boy asks for and receives a piece of lumber of certain dimensions from the boy in charge of material. If he is honest, the exact amount is charged to each. The boy giving it knows that the is responsible for all lumber given, and the boy receiving it knows the same thing; so when he cuts the dimensions requested, he cuts exactly, and tells exactly what

he cuts. Why? Perhaps at first he reasons that soon he himself will be in the same position, and so he follows the Golden Rule.

Rules were made to be broken for many students. How about the students in the general shop? He knows that he himself will have to enforce certain rules concerning the distribution of tools, materials, and supplies, when it is his turn at the position, and so his attitude toward rules is healthy. He realizes that they are for a purpose. So he looks for the reasons behind the rules. It will tend to give him the same habit later in life concerning other rules. The carry-over into other occupations and life pursuits is in terms of like elements. He has looked for the reasons before in the various units of the comprehensive shop, and a habit may develop.

When can some of the other traits mentioned both by Hunt and Brewer fit into the general shop? Disinterest is due primarily to the facts that the boy is told what to do and is given no reasons for the necessity of doing it. Let us assume that a boy ask for permission to do a certain project. How shall the instructor handle that request? It is one that the instructor knows is beyond his ability. Shall he say "No, you can't make that? You don't know how to do it yet. Wait 'til the end of the year or until next year", or shall he use his opportunity to be the teacher

rather than the last word of authority? Let us assume that he is the teacher. Then he will use this opportunity to let the boy teach himself that he has not at present the ability to do this project. Of course there is another alternative; he may let the boy go ahead and find out for himself that he can't do it and waste his time and material, for which his father has paid, and by the expensive experience method find out that the instructor was correct. That is too costly, and the easiest way out. The better way is to work with the boy in the development of his project idea, step by step, by means of the job analysis sheets. Very soon he will prove to himself that he is unable to perform certain stages of his complete job until he has acquired other skills. He is satisfied, he is motivated anew, and there have been important guidance features present in this performance. This is positive guidance. The first method is guidance of a certain type, but it is all negative.

As the boy begins to appreciate these procedures we have a new boy awakening. He wants nothing but the best workmanship, and is not satisfied until he can do that. He becomes more and more effieient. He reasons his way better through each problem and project. There are fewer wasteful motions. The finished product is good. So is the boy. Is this character development? Yes. Guidance

is directing the boy in the pathway of skilled workmanship, efficiency, higher purposes and better attitudes. The sum total of guidance results in improved character.

There are so many places in the general shop where character can be developed that it would take many more pages to enumerate then. The choice of courses is the chief factor here. Proper guidance will do away with many difficulties later in his school career. Aptitude tests, intelligence tests, personal talks will all aid in the proper selections. Carelessness due to lack of interest in the course can be avoided through proper early guidance. Even at a later stage the matter can be corrected by the shop instructor who is interested and can discover the boy's interest in some other branch of the comprehensive shop. It isn't as though the boy were in a shop and had to remain in that particular class unit until the period came for a shift in shops.

The guidance and character development plans are more effective in a smaller group where the instructor can deal individually with each boy, than they are in the larger specialized shop where he has not the opportunity to counsel and guide individually.

The objection that will be raised is the usual one that is valid in that field where there can be no objective tests given. There is no proof that the program

that has been discussed in this paper is the one that is the answer to the entire matter. The general conclusions seem to point that in the smaller school, those having five hundred or less boys, the general shop program is the better. It is more efficient. It answer~~e~~s better the functions of the junior high school. It offer~~e~~s more guidance and character building values, due to its smaller classes, its opportunities for exploration, its attempt to make the class as nearly like a life situation as possible. It uses to the utmost the pupils interest in his own projects, Thus it assists in the development of those traits that are essential to the character of the student. In the development of this character and in the guidance features, the conclusions are that the general shop better fulfills the functions of the junior high school than do the short specialized industrial arts courses.

END.

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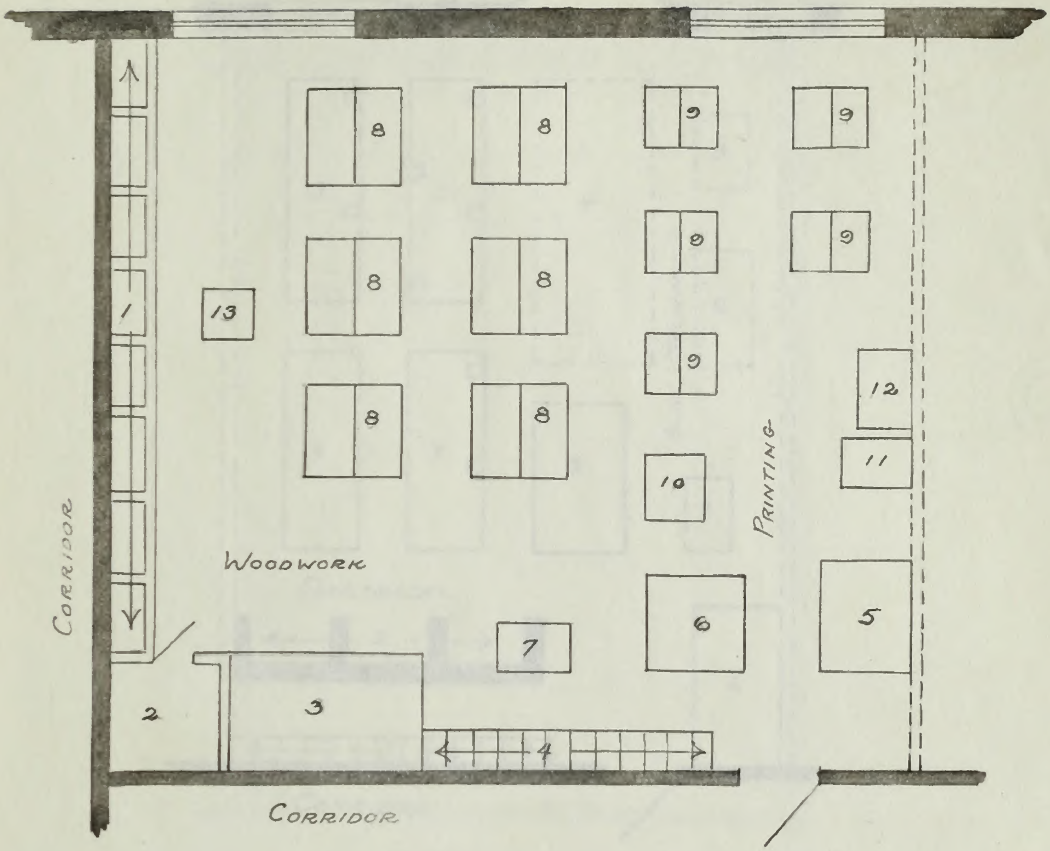
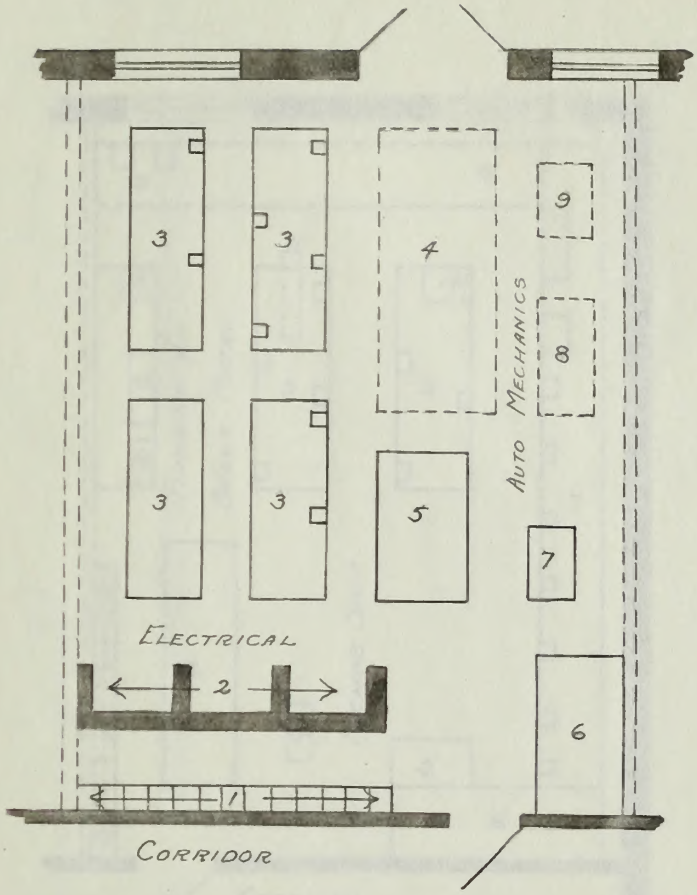


Key

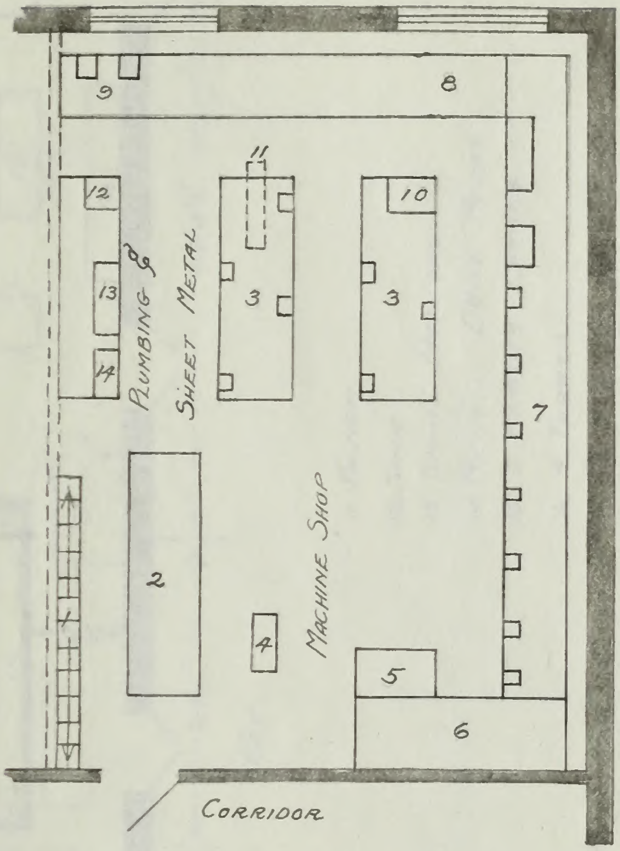
1. Wood Stock Bins (made of pipe)
2. Fireproof Paint Cabinet
3. Tool Crib
4. 72 Lockers
5. Press
6. Paper Cutter
7. Desk
8. Bench
9. Cabinet
10. Imposing Stone
11. Ink Cabinet
12. Wall Cabinet
13. Saw

GENERAL SHOP PLAN
SCRANTON, PA.



1. 72 LOCKERS
2. WIRING BOOTHS
3. BENCH
4. CHASSIS
5. VULCANIZING BENCH
6. TOOL CRIB
7. DESK
8. DIFFERENTIAL
9. TRANSMISSION

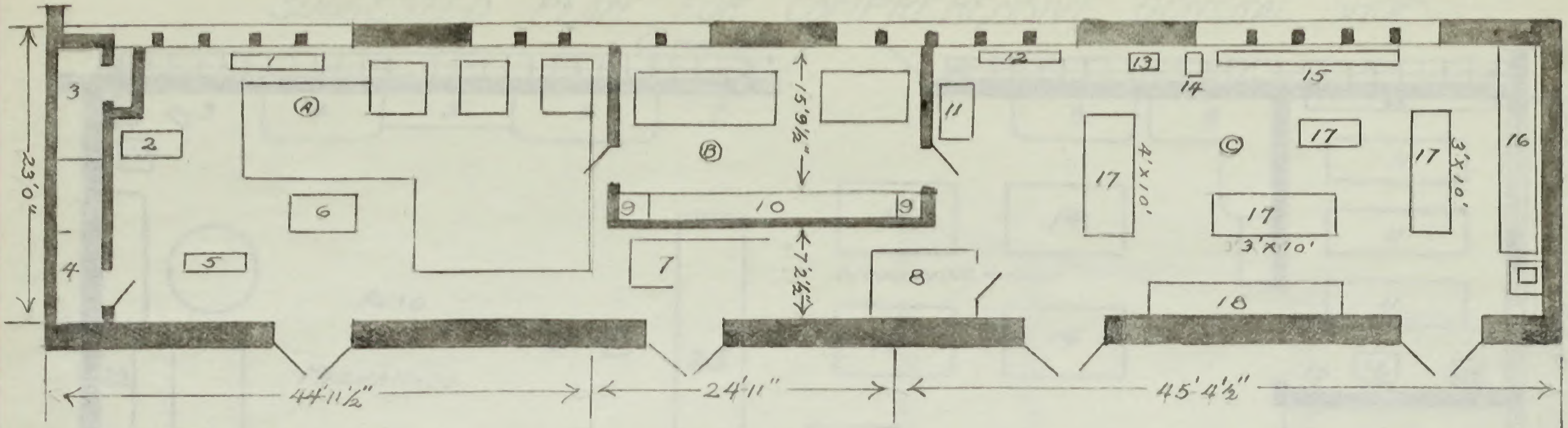
GENERAL SHOP PLAN
SCRANTON, PA.



KEY

1. 72 LOCKERS
2. BENCH
3. BENCH WITH VISES
4. SAW
5. DESK
6. STOCK RACK
7. BENCH - 7 VISES
8. LAYOUT BENCH
9. SOLDERING BENCH
10. GRINDER
11. HOLLOW MANDREL
12. ROTARY MACHINE
13. BENCHPLATE
14. BRAKE

GENERAL SHOP PLAN
SCRANTON, PA.

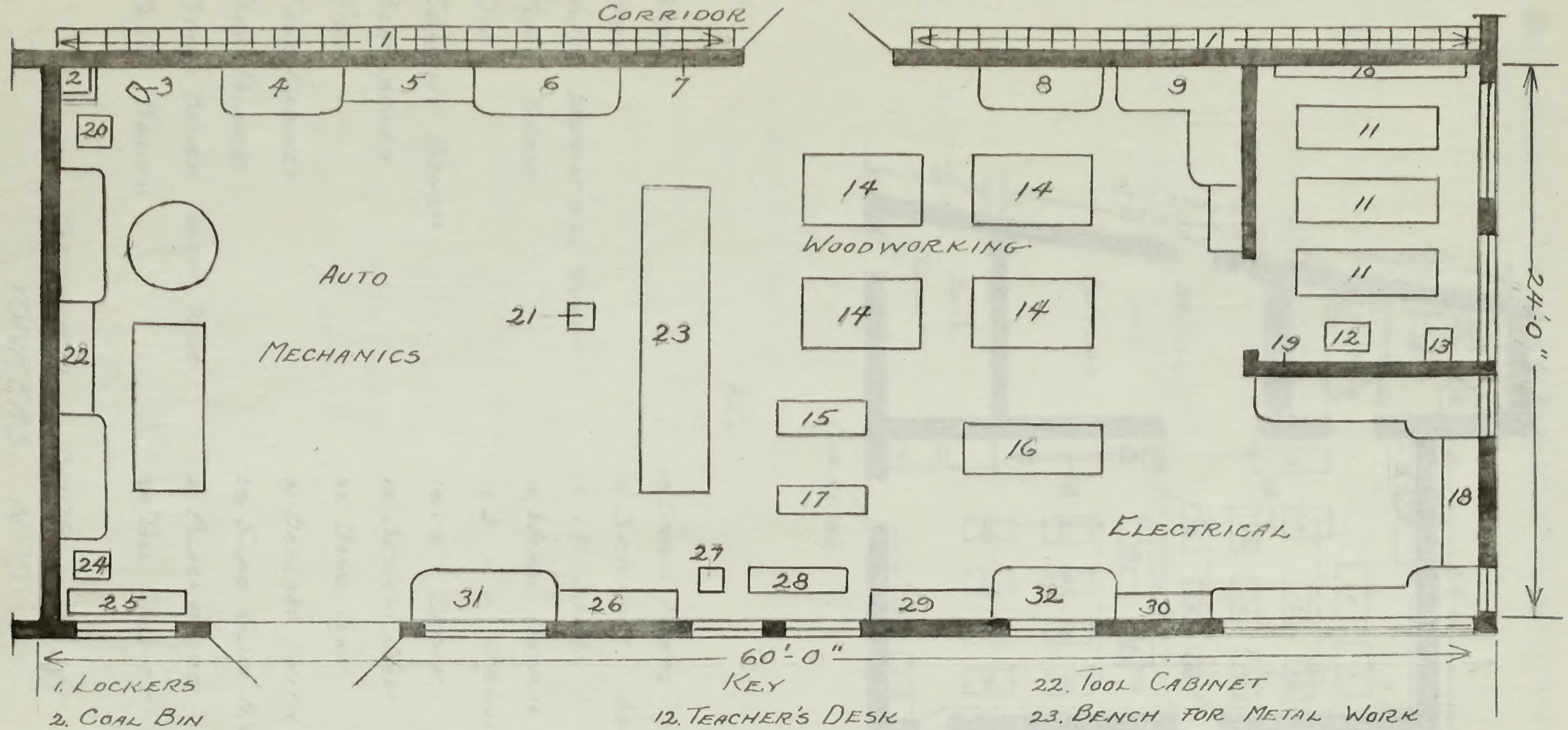


KEY

Ⓐ Wood Shop
Ⓑ Drafting Room
Ⓒ Metal Shop
1. Wood Turning Lathe
2. 30" Band Saw
3. Tool Room
4. Storage Room with Balcony
5. 8" Jointer
6. Table Saw
7. Lumber Room
8. Tool Room
9. Desk
10. Small Storage Room
11. Bench
12. Sink
13. Small Hacksaw
14. Bench Drill Press
15. 2 Engine Lathes
16. 4 Forges
17. Bench
18. Electrical Booth (2 story)

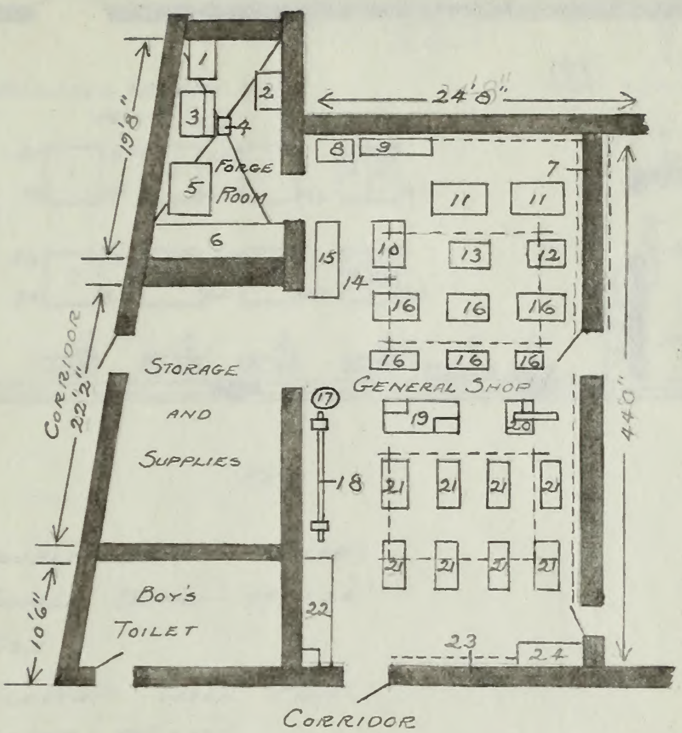
GENERAL SHOP PLAN
RICHMOND, IND.

SUGGESTED PLAN FOR COMPREHENSIVE GENERAL SHOP



KEY

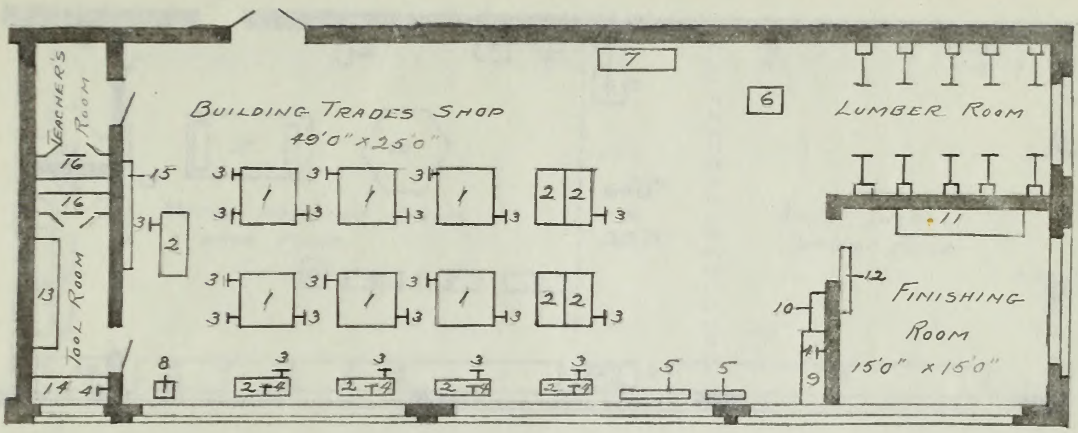
1. LOCKERS
2. COAL BIN
3. ANVIL
4. BENCH FOR CONCRETE WORK
5. TOOL CABINET
6. BENCH FOR GLAZING AND COBBLING
7. BULLETIN BOARD
8. LAVATORY
9. BENCH AND CABINET FOR FINISHING
10. BOOKCASE
11. DRAWING TABLES
12. TEACHER'S DESK
13. FILE
14. WOODWORKING BENCHES
15. SAW BENCH
16. JOINTER
17. BAND SAW
18. TOOL CABINET
19. BLACKBOARD
20. FORGE
21. CHAIN HOIST
22. TOOL CABINET
23. BENCH FOR METAL WORK
24. DRILL PRESS
25. ENGINE LATHE
26. TOOL CABINET
27. GRINDER
28. WOOD LATHE
29. TOOL CABINET
30. VERTICAL LUMBER RACK
31. BENCH FOR PLUMBING AND PIPE FITTING
32. GLUE BENCH



KEY

1. FORGE
2. ANVIL
3. WATER, SAWDUST AND PICKUP
4. FLOOR DRAIN
5. OVEN
6. CEMENT BENCH
7. BLACKBOARD
8. SINK
9. TOOL CABINET
10. BAR FOLDER
11. STAKE BENCH WITH VISE
12. PEXTO BENCH
13. DRILL PRESS
14. SKYLIGHT ABOVE
15. 13" LATHE
16. WORK BENCH
17. 2 H. P. GRINDER
18. 6' LATHE
19. BENCH SAW
20. BAND SAW
21. BENCHES WITH VISES
22. ELEC. GLUE POT AND GLUE BENCH
23. BLACKBOARD
24. TOOL CABINET

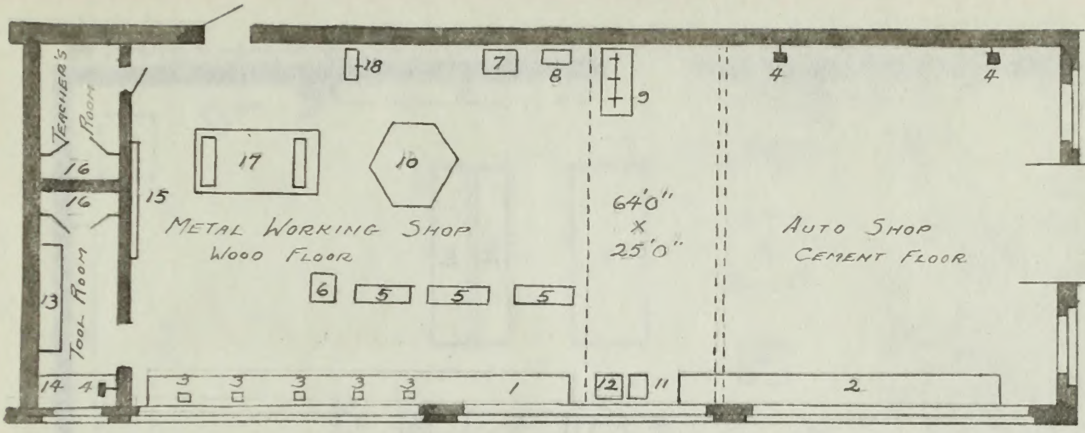
GENERAL SHOP PLAN
YONKERS, N.Y.



KEY

1. DOUBLE BENCH - 40" x 48"
2. SINGLE BENCH - 48" x 24"
3. VISE
4. ELECTRIC WALL PLUG
5. LATHE - 60" x 12"
6. VARIETY SAW - 30" x 22"
7. JOINTER - 66" x 18"
8. GRINDER - 18" x 16"
9. GLUE BENCH - 60" x 28"
10. SINK - 30" x 20"
11. ZINK COVERED BENCH - 9' x 2'
12. SLIDING METAL COVERED DOOR
13. TOOL RACK
14. BENCH - 72" x 22"
15. SLIDING BLACKBOARD 8' LONG
16. CABINET - 72" x 22"

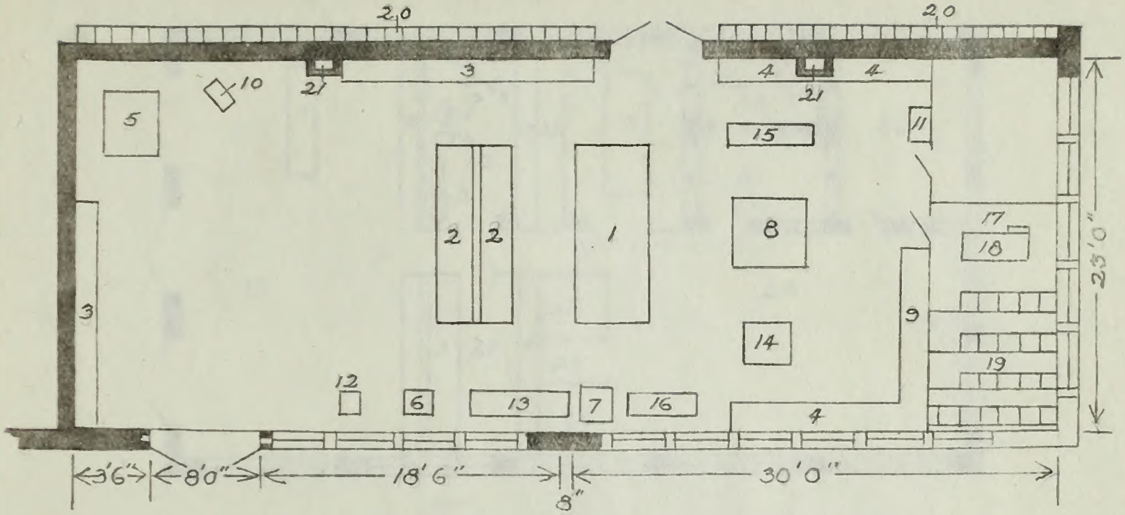
A BUILDING TRADES SHOP
N.Y. STATE DEPT. OF EDUCATION
TOTAL FLOOR AREA - 1,750 SQ. FT.



KEY

1. BENCH - 29'6 x 2'
2. BENCH - 23' x 2'
3. GAS BUZZERS
4. ELECTRICAL PLUGS
5. LATHE - 54" x 18"
6. SHAPER - 24" x 24"
7. DRILL PRESS - 30" x 18"
8. CUT OFF SAW - 24" x 12"
9. WASH TROUGH - 5' x 2'
10. SHEET METAL MACHINE BENCH - 5'
11. ANVIL - 24" x 10"
12. FURNACE - 24" x 26"
13. TOOL RACKS
14. BENCH - 6' x 2'
15. SLIDING BLACKBOARD - 8'
16. CABINET - 6' x 2'
17. SHEET METAL TABLE WITH FOLDER AND ROLLER - 8' x 4'
18. SHEARS - 20" x 8"

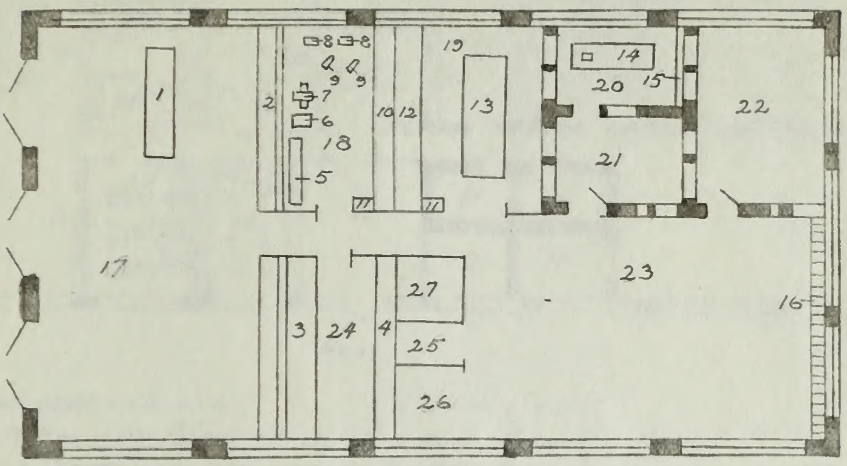
A METAL TRADES SHOP
N.Y. STATE DEPT. OF EDUCATION
TOTAL FLOOR AREA - 1,750 SQ. FT.



KEY

1. 1 Table for Household Mechanics - 10'11" x 4'6"
2. 2 Tables for Elementary Electricity - 10'11" x 2'2"
3. Machine Work Bench - 15'6" x 1'6"
4. Wood Work Bench - 13' x 1'6"
5. Forge - 48" x 40"
6. Drill Press - 21" x 24"
7. Power Unit - 30" x 24"
8. Saw Bench - 55" x 51"
9. Plumbing and Soldering - 10' x 1'6"
10. Anvil - 24" x 12"
11. Sink - 24" x 15"
12. Grinder - 22" x 18"
13. Machine Lathe - 6'6" x 21"
14. Band Saw - 30" x 32"
15. Jointer - 66" x 18"
16. Wood Lathe - 54" x 22"
17. Blackboard
18. Bench
19. Demonstration Theatre
20. Lockers
21. Vent

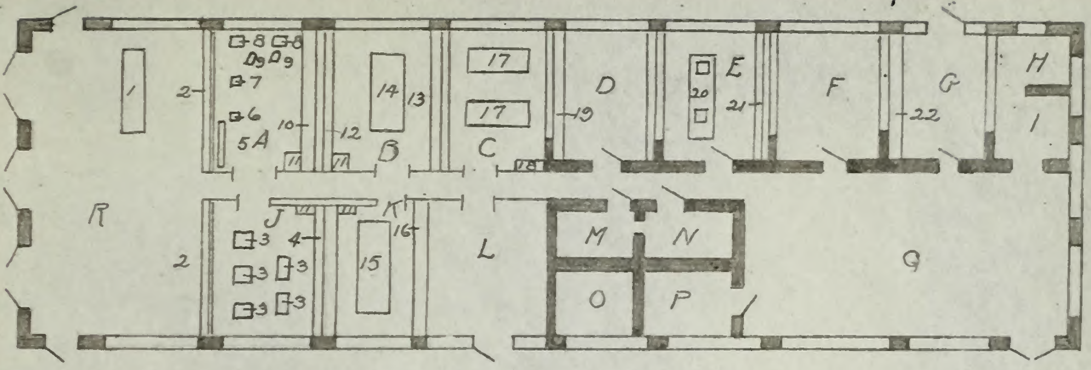
GENERAL SHOP PLAN
MICHIGAN
TOTAL FLOOR AREA - 1,395 SQ. FT.



KEY

1. PIT - 10'4" x 2'6"
2. AUTO BENCH - 17' x 26"
3. ELECTRICAL BENCH - 17' x 36"
4. ELECTRICAL BENCH - 17' x 26"
5. ENGINE LATHE - 6' x 11"
6. DRILL PRESS - 20" x 12"
7. GRINDER - 12" x 12"
8. HAND FORGE - 18" x 18"
9. ANVIL - 18" x 10"
10. MACHINE BENCH - 17' x 26"
11. BOOK CASE - 34" x 11"
12. PLUMBING BENCH - 17' x 26"
13. SHEET METAL BENCH - 10'6" x 4'
14. LABORATORY TABLE - 7'4" x 2'
15. CABINET - 7'10" x 15"
16. LOCKERS - 12" x 12"
17. AUTO REPAIR - 24' x 38'
18. MACHINE - 12' x 16'6"
19. SHEET METAL - 14' x 16'6"
20. SCIENCE - 12' x 17'9"
21. DRAWING, OR LIBRARY - 12' x 8'
22. AGRICULTURAL PROJECTS - 12' x 16'6"
23. CEMENT CONSTRUCTION, HOME CARPENTRY, AND FURNITURE REPAIR - 39'6" x 21'6"
24. ELECTRICAL - 12' x 17'
25. SHOE REPAIR
26. UPHOLSTERING
27. TOOLS

SHOP FOR HOME & COMMUNITY OCCUPATIONS
STATE DEPT. OF VOCATIONAL EDUCATION, CALIF.
TOTAL FLOOR AREA - 2,888 SQ. FT.



KEY

A. MACHINE DEPT. - 12' x 17'

B SHEET METAL AND PLUMBING - 16' x 17'

C. DRAWING DEPT. - 13' x 17'

D. LECTURE - LIBRARY - 14' x 17'

E. SCIENCE DEPT. - 14' x 17'

F. PRINTING - 14' x 17'

G. AGRICULTURAL PROJECTS - 13' x 17'

H. SHOE REPAIR - 8' x 10'

I. UPHOLSTERING - 9' x 10'

J. GAS ENGINE - 12' x 17'

K. ELECTRICAL - 12' x 17'

L. LOCKER ROOM - 14' x 17'

M. TOOL ROOM - 7'6" x 11'

N. OFFICE - 7'6" x 12'

O. WASH ROOM - 8'6" x 11'

P. FINISHING - 8'6" x 12'

Q. CEMENT CONSTRUCTION, HOME CARPENTRY, FURNITURE REPAIR - 41' x 21'

R. AUTO REPAIR - 24' x 38'

1. PIT - 11' x 2'6"
2. AUTO BENCH - 17' x 26"
3. GAS ENGINE
4. GAS ENGINE BENCH - 17' x 22"
5. ENGINE LATHE - 6' x 14"
6. DRILL PRESS - 20" x 12"
7. GRINDER - 12" x 12"
8. HAND FORGE - 18" x 18"
9. ANVIL - 18" x 10"
10. MACHINE BENCH - 17' x 26"
11. BOOK CASE - 34" x 11"
12. SHEET METAL BENCH - 17' x 24"
13. PLUMBING BENCH - 17' x 22"
14. SHEET METAL BENCH - 10'6" x 4'
15. ELECTRICAL BENCH - 11'9" x 4'
16. ELECTRICAL BENCH - 17' x 22"
17. DRAWING TABLE - 7'6" x 3'
18. DRAWING CASE - 4'6" x 18"
19. BOOK AND DISPLAY CASE - 17' x 18"
20. LABORATORY TABLE - 10' x 3'
21. CABINET - 17' x 18"
22. CASE - 17' x 18"

SHOP FOR HOME & COMMUNITY OCCUPATIONS
STATE DEPT. OF VOCATIONAL EDUCATION, CALIF.
TOTAL FLOOR AREA - 4,940 SQ. FT.

BOSTON UNIVERSITY
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